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**ERRATUM.**

Vol. 7, p. 46, *for* Percelli-Titone *read* Porcelli-Titone.

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## TROPICAL DISEASES BUREAU.

TROPICAL DISEASES  
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Vol. 7.]

1916.

[No. 1.

## YAWS.

BUTLER (C. S.). **Some Facts and Some Fancies regarding the Unity of Yaws and Syphilis.**—*U.S. Naval. Med. Bull.* 1914. Oct. Vol. 8. No. 4. pp. 561-571. With 1 plate.

The author remarks, "in extenuation of my presuming to bring in question the matter of duality of viruses between yaws and syphilis, I will say that I myself am inclined to the side of duality, but that in seeking an explanation for many observed facts, the open mind attitude compels the admission that I am uncertain and that many facts are better explained on the basis that yaws and syphilis are but different clinical manifestations of the same disease."

After this preliminary the writer brings forward a number of interesting observations and arguments in support of the latter view and discusses them under the following heads: (1) Epidemiologic and climatic, (2) pathologic, (3) symptomatic, (4) therapeutic, and (5) immunologic.

With regard to its distribution, the strict limitation of yaws to the tropics is considered to be one of the strongest indications that in it we are simply dealing with syphilis. There is no other inoculable and contagious disease requiring no intermediate host which is thus delimited.

With regard to the statement that yaws is generally a non-venereal disease, the author remarks that he has never seen such admirable conditions for the transmission of innocent syphilis as exist among the lower class natives of the Philippines, and TARNOWSKY's statement is mentioned that in certain parts of Russia 70 per cent. of the cases of syphilis are non-venereal in origin.

On histological grounds it would seem to be impossible to differentiate yaws from syphilis, for the lesions cannot be distinguished with any degree of certainty.

The author performed the interesting experiment of inoculating a human case of syphilis in the secondary stage, with material from a case of florid yaws. The result was entirely negative (with the exception of an apparent allergic reaction) up to the time of writing, a period of ten months.

Certain authors have reported the rather frequent occurrence of yaws following syphilis or vice versa, but the experience of the naval

medical men at Guam is against this statement. In that island, although about 90 per cent. of the rural population has yaws at some time during life, no case of primary or secondary syphilis has been observed during fourteen years.

[The original paper should be consulted by those interested in this subject as the question is discussed in some detail.]

E. Hindle.

- i. GARROW (Alexander). **Syphills or Yaws?**—*S. African Med. Rec.* 1915. Apr. 10. Vol. 13. No. 7. pp. 89-95. With 1 plate.
- ii. de Vos HUGO (D.). **Syphills or Yaws?**—*Ibid.* Apr. 24. No. 8. pp. 107-109. With 2 figs.

i. In this article the writer discusses a disease in the Northern Districts of South Africa, which has been regarded by certain doctors as native syphilis and by others as yaws or a disease resembling yaws. This disease is very common in the Kimberley District and the author has made notes of 50 cases. Many of these cases are described in detail and from the descriptions there seems to be little doubt of their being syphilitic and not yaws. In conclusion it is suggested that, as the matter is one of sufficient importance to demand investigation, it would be well if a bacteriological enquiry into the matter were instituted.

ii. A polemical article in which the writer brings forward evidence in support of his view that a disease closely allied to, if not identical with yaws, exists side by side with syphilis in South Africa. In an addendum GARROW's paper is criticised, and the writer considers that the arguments there advanced in support of the true syphilis theory are not convincing, for they show that the disease is usually different from typical cases of syphilis such as occur in Europe.

E. H.

- i. DUPREY (A. B.). **The Management and Treatment of Yaws exemplified by Two Cases.** [Correspondence].—*Lancet.* 1915. June 12. pp. 1260-1261.
- ii McDONALD (W. M.). **Salvarsan in the Treatment of Yaws.**—*Ibid.* Sept. 18. pp. 649-650. With 2 figs.

i. The writer calls attention to some of the methods of dealing with yaws cases in the British West Indies. Segregation is the chief object desired and ordinances are passed to drive infected patients into special hospitals, and yet in some cases the patients leave the hospitals still carrying well-marked nodules.

The decrease in the prevalence of yaws is stated to be associated with the advance of scientific agriculture and corresponding improved conditions.

The writer remarks that although there is no difficulty in finding the syphilis spirochaete, he has never yet been able to obtain the organism of yaws. The latter is considered to be purely and simply a contagious skin disease and to have no relation whatever with syphilis.

The virtues of arsenical preparations are next discussed and the writer states that much less dangerous compounds of arsenic than salvarsan, intelligently used, have the same effect. The dangers of salvarsan in the hands of unskilled operators are then exemplified by

a description of two cases, in one of which the patient died as a result of aggravated kidney troubles and in the other an abscess was formed at the site of injection, resulting in the damagement of the sciatic nerve and consequent weakness of the leg and foot.

[In spite of this correspondent's pessimistic views there seems no doubt whatever that the treatment of yaws by intravenous injections of neosalvarsan gives far superior results to those obtained by any other method.]

ii. The writer strongly opposes the statements in DUPREY's letter, and shows that the salvarsan treatment of yaws is "one of the greatest benefits which the medical [*sic*] profession has ever conferred on tropical countries." Two good photographs are given showing a case of yaws before and after treatment with salvarsan.

E. H.

SPAAR (E. C.). **Notes on Three Cases of Parangi, treated with Dr. Castellani's Mixture.**—*Jl. Trop. Med. & Hyg.* 1915. Aug. 2. Vol. 18. No. 15. pp. 170–171. With 2 text-figs.

The description of three cases of yaws treated in Ceylon with CASTELLANI's mixture [see this *Bulletin*, Vol. 5, p. 422]. In all three cases the treatment was very satisfactory, improvement taking place within a very few days, and each patient was cured from two to three weeks after the treatment was commenced.

E. H.

## SPRUE.

- ASHFORD (Bailey K.). i. **A Monilia found in Certain Cases of Sprue. Preliminary Note.**—*Jl. Amer. Med. Assoc.* 1915. Mar. 6. Vol. 64. No. 10. pp. 810-813.
- ii. **Relation of the Genus "Monilia" to Certain Fermentative Conditions of the Intestinal Tract in Porto Rico.**—*Ibid.* June 5. No. 23. pp. 1893-1896.
- iii. **Is Sprue a Monilliasis of the Digestive Tract? Institute of Tropical Medicine and Hygiene of Porto Rico.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1915. July. Vol. 3. No. 1. pp. 32-46. With 2 plates.

i. While studying four cases of sprue in Porto Rico, the author isolated from the inflamed tongue a *Monilia* which he considers to be a different species (as distinguished by its cultural characteristics and its behaviour with solutions of various sugars) from any hitherto described by the reviewer or other investigators of this disease.

He was unable to obtain similar cultures from normal tongues or from other cases of sprue in which the tongue was not involved. The amount of acidity produced by culture of the organism in sugar solutions was determined by titration according to the method advocated by the Bacteriological Committee of the American Public Health Association. A hypodermic injection of a ten-day culture of this yeast into the muscular tissue of the tongue killed a large rabbit in seventy-five hours; after forty hours a severe diarrhoea with the production of much gas supervened. Death occurred from a generalized infection. Cultures made with strict aseptic precautions from the internal organs and heart's blood and also from the tongue yielded positive growths of this yeast. An abundant growth was also obtained from the mucoid layer of the stomach and small intestine. Further details of this interesting experiment are promised shortly.

[According to the reviewer's experience it appears to be unscientific to rely on the sugar reactions of the *Monilias* with a view to their classification. From the research on sprue he was privileged to take part in, and which is now published in full, it will be seen that *Monilias* intensely pathogenic to rabbits were frequently isolated from sprue tongues both during life and post mortem.]

P. H. Bahr.

ii. In this second paper Ashford gives some account of the particular species of *Monilia* which he is inclined to regard as an etiological factor in the production of sprue. It causes an acid reaction on glucose, laevulose, maltose, saccharose and galactose. It does not liquefy gelatin or serum and it renders milk alkaline.

Five drops of a pure culture were injected into the tongue muscles of a large Belgian hare, which died 75 hours thereafter with enormous production of intestinal gas and diarrhoea but without sore tongue. The organism was recovered after death from practically all the organs.

"The same organism—which, by the way, was one isolated from the tongue of one of our most beloved officials of the American Government here, and which not long since caused his death—was fed in pure culture to a one-thousand gram guinea-pig, causing, I suspect, its death three

weeks thereafter. Cultures from the organs of the body, save tongue and stomach, however, were very disappointing, and the histopathologic picture in its intestines and stomach has not yet been worked out for lack of time. This animal also suffered from gas and diarrhea. Cultures of this organism with malted milk were fed during a time to a monkey. This monkey is still alive . . . it is rapidly declining in health, becoming thin and sick, with occasional sharp diarrhea. The last word must yet be said on this animal."

The author has not found *M. albicans* in Porto Rico.

iii. The same writer gives an extremely vivid account of the clinical symptoms shown by sufferers in Porto Rico from "fermentative indigestion" and by cases of actual sprue. It was difficult to say where sprue began and the other ended. Hitherto the diagnosis of sprue required the presence of four cardinal symptoms: (1) A typical tongue; (2) a gaseous bowel; (3) the characteristic stools; and (4) a small liver; but in the author's view there is a "tongue" sprue, an "intestinal" sprue and complete sprue "with a bewildering shifting of the scene from bowel to tongue and back again in the shortest possible time." The writer gives an interesting description of the clinical characteristics as they affect the tongue, the stomach, the liver, pancreas and intestine. The blood picture shows little. The leucocyte count is normal or slightly reduced with a relative increase of the lymphocytes. The tongue lesions are often clinically and histopathologically indistinguishable from ordinary thrush, a disease due as a rule to *Monilia albicans*.

The writer had an opportunity of studying the epidemiology of sprue. In San Juan sprue was very prevalent, whereas in the mountainous districts only a very few cases of true sprue and only a few sprue suspects were detected. In the mountains the people rarely ate bread whereas in San Juan it is a staple food. "Its quality has in many places deteriorated being now sour, sodden and of unusual taste." Coincidentally sprue has increased in frequency. The communicability of sprue is also evident from the number of family endemics observed. Cultures were made from the tongue, and stools of 197 persons; 49 were distinctly cases of sprue and in all there was a *Monilia*, not *M. albicans* but one of a hitherto undescribed species: 92 were cases in which gastro-intestinal disturbances ranged from mere vagaries to serious disease, chiefly accompanied by excessive gas production; 17 per cent. of these harboured the same fungus. Sixty-six persons apparently normal were examined and only 3 per cent. harboured this *Monilia*. The organism was pathogenic for small laboratory animals, causing diarrhoea by injection into the peritoneum and excess of intestinal gas by feeding experiments. This *Monilia* was also isolated from the centre of a loaf of bread from an endemic focus. Complement fixation tests in a series of normal persons were negative, but in a few cases of sprue positive results were obtained.

J. C. G. Ledingham.

GABBI (Umberto). *Sulla presenza di casi autoctoni di sprue nella Calabria e nella Sicilia. Primo Contributo Clinico.* [On the Occurrence of Autochthonous Cases of Sprue in Calabria and Sicily.]—*Malaria e Malat. d. Paesi Caldi*. 1915. Mar.-Apr. Vol. 6. No. 2. pp. 81-88: and *Pathologica* 1915. Apr. 1. Vol. 7. No. 154. pp. 153-158.

In this communication, Professor Gabbi records observations, made some years ago, on three apparently indigenous cases of a malady which presented all the characteristics of tropical sprue. They were met with in Calabria and Sicily and one of the writer's chief aims is to draw the attention of his medical colleagues in Southern Italy to the presence of this disease and to point out the dangers involved by its possible diffusion. The following are brief notes of the cases:—

Case 1.—Female (32). Father had been gouty and suffered from arteriosclerosis. Mother and a brother also gouty, the latter also neuasthenic. No maladies of any importance in past history. Married, with healthy family. No tubercle or lues in family history. In 1911 the appearance of buccal thrush was noted. Tongue red. Unusual sensation of sourness in mouth. Other disturbances followed. Feeling of heaviness after eating, troublesome eructations. Frequent desire to defaecate. Stools liquid, foetid and small in quantity. No smarting in anal region. These disturbances not accompanied by fever. They were considered by the physicians as gouty manifestations and appropriate drugs prescribed including urotropin, astringents and consumption of Vichy water. The case did not improve. Thrush increased and became diffused over the throat and possibly extended also to the oesophagus as there was a feeling of smarting during deglutition. Symptoms increased and patient became weak, emaciated and anaemic. When the patient was first seen by Gabbi, he was unable to formulate a definite diagnosis. At his second examination of the patient, the skin was dry and inelastic, the gums tumid and red, saliva abundant and acrid. No organic lesion in circulatory or respiratory systems. Slight pain over epigastrium. Spleen normal. Liver slightly enlarged. No albumin or sugar in urine, no mucus or blood in stools. Thinking again that the condition was of gouty origin, alkaline waters were prescribed, also astringents and mouth disinfectants. The malady however progressed and ended fatally. Menses continued to the end.

Case 2.—Female, 34. Gouty heredity. Married with healthy children. In 1911, she commenced to have an acid taste and feeling of heat in the mouth. Buccal thrush spread, tongue and gums red, troublesome eructations. Intestinal disturbances followed, diarrhoea with yellowish foetid stools. Teeth began to give trouble. Gout was considered to be the cause of the malady and appropriate treatment prescribed. She did not however improve. Skin became pallid. Finally she was put on a milk diet, fresh vegetables, etc., and proceeded to recover very slowly.

Case 3. Male, 40. Symptoms very similar to those of above two cases.

From a consideration of his cases Professor Gabbi summarises the symptoms thus: 1st Period. Slow insidious onset characterised by dyspepsia and swollen-up feeling in epigastrium. Eructations after eating. Diarrhoea with pultaceous, greenish-yellow, foul-smelling stools. 2nd Period, characterised by the spread of buccal thrush. Sour taste in mouth. Several motions (4-6) per day. Anaemia, disappearance of fat, no fever. Skin dry and inelastic. Alternate improvements and relapses. Cure may result or death may take place through aggravation of intestinal disturbances, uncontrollable vomiting, syncope or some grave complication.

The syndrome affects adults and especially females. When in this country last year Professor Gabbi had been unable to see any cases of sprue in the hospitals attached to the London or Liverpool tropical schools, but recently he had an opportunity of seeing a similar case in Rome, a lady returned from Saigon.

In Egypt, India and Syria the disease has been noted. In Bombay, Calcutta and Colombo there are endemic foci and owing to the important commercial relations that subsist between these cities and English and Mediterranean ports, especially Messina and Naples, it is not unreasonable to suppose that the germs of sprue may be transported either in merchandise or by affected members of the crew. Gabbi's cases occurred in merchants' families living in maritime cities. He recommends that port medical officers should enquire into slight cases of diarrhoea on board ship and, in this way, some light might be thrown on the mode of diffusion of this chronic and sometimes lethal malady.

J. C. G. L.

**BRAU (P.) & NOGUE.** *Sur la diarrhée chronique dite diarrhée de Cochinchine.*—*Far East. Assoc. Trop. Med. C. R. Trois. Congrès Biennal. Saigon (1913).* 1914. pp. 83-91.

The authors draw attention to the existence of renal insufficiency in persons suffering from the chronic diarrhoea (? sprue) of Cochinchina and give directions for its treatment. Evidence of renal troubles is supplied by local or general oedema, and albuminuria may or may not coexist. Syphilis or alcoholism may certainly cause the nephritis in some patients, but others do not appear to have had any affection capable of injuring the kidneys other than the intestinal trouble. With regard to the etiology of these cases, which present as near as possible the classical symptoms of sprue, one of the authors has made during the past three years daily examination of stools for intestinal parasites, helminths or protozoa. Almost always in the frothy yellowish stools of these cases, one finds very motile amoebae presenting all the characters of the type described by SCHAUDINN, with the exception of red blood cell phagocytosis. In the rare autopsies performed, the intestinal mucosa presents no lesions characteristic of intestinal amoebiasis and the authors believe that amoebae play only a saprophytic rôle like the flagellates so frequently met with. These parasites may very possibly have been the causal agents of the first attack of diarrhoea. To bring the patient to the condition of sprue, more general and profound causes come into play and one of these is, in the authors' opinion, renal insufficiency. As to treatment, calomel, ipecac and emetine are of little use. It is preferable to inhibit the growth of secondary bacteria and remove helminths. Thymol and Betanaphthol in small daily doses (1 gm. per day on the average) are useful for the latter. To inhibit bacterial development, some preparation of lactic ferments is indicated. Gastro-intestinal dyspepsia should be treated by opotherapeutic preparations, such as gastric or enteric extract. If examination of the stools reveals pancreatic insufficiency, prescribe pancreatic extract. When renal insufficiency is present, the patient should be placed on salt-free diet. Light baths for the abdomen are also of value. If there is a tendency to oedema, emetin must be employed with prudence, and accompanied by medication directed to raising the blood pressure. Emetin lowers blood pressure and may consequently favour the production of oedema in persons predisposed thereto.

J. C. G. L.



## BERIBERI.

KENNEDY (J. C.). **Beriberi in Lebong. An Account of the Steps taken to eradicate the Disease during 1914.**—*Jl. R. Army Med. Corps.* 1915. Sept. Vol. 25. No. 3. pp. 268-285. With 2 charts.

This report is a model in its way of an investigation into the epidemiology of a form of beriberi occurring locally in a military station. At Lebong there were in 1911 forty-six cases, in 1912 twenty-six, in 1913 sixty-three; in 1914, owing to the preventive measures taken, the incidence was reduced to four. Very early in the enquiry it was recognised that the cases were true beriberi, that the disease was not due to any bacterial or protozoal organisms, and that the food of the troops was dangerously lacking in vitamin content. Recommendations for a fixed dietary with supervision of the cooking had been laid down, and the appointment of an officer to supervise the whole food question; for this Major Kennedy was selected. A detailed account of the four cases which occurred in 1914 is given; all belonged to one company which was housed furthest away in the cantonment. These huts were found to be overcrowded and less hygienic than the others. The men had to travel a greater distance to obtain food between parades, etc., which had a depressing effect, predisposing to the disease. With regard to the dietary, the meat ration was found to be inferior and often badly cooked; supplementary articles of food were insufficient and difficult to get. The dietary was increased by voluntary methods and *every* man was given a substantial evening meal. It was noted that there was a regular loss of weight amongst the men during the rainy season (July to August), which was associated with digestive disorders, and that often physical exercise carried out in excess under these conditions predisposed to the development of beriberi. From the vomit of a beriberi patient two non-lactose fermenting organisms were isolated, one being *B. faecalis alkaligenes*, which agglutinated up to 1/20 with the patient's serum. Previous observers have noted a disease in dogs bearing some resemblance to beriberi; for this the author found the causal organism to be a small streptococcus and the disease was cured by a course of mercurial treatment.

The author concludes that the disease at Lebong was true beriberi, that it was not infectious nor contagious, that it was eradicated by improvement in the dietary and attention to the general health, hygienic surroundings and physical exercise, and that climate, climatic disease (diarrhoea) and badly regulated physical exercise predisposed to beriberi.

The Government has since sanctioned the issue of extra articles of diet recommended and the result will be interesting to note in future reports from this station.

P. W. Bassett-Smith.

CAJAZEIRA (Jose Antonio). **Polynevrite palustre e Beriberi.** [Malarial Polyneuritis and Beriberi.] [With summary in German.]—*Arch. Brasil. de Med.* 1915. June-July. Vol. 5. Nos. 6-7. pp. 252-265.

From his own observations and the researches of others in the country the author draws the following conclusions.—No true form

of malarial polyneuritis exists, as stated in books and generally believed by Brazilian medical men to be found in the towns of Itacoatiara, Manaus or Corumba (Matto Grosso).

He was never able, after the examination of hundreds of cases, to prove that the polyneuritis was malarial, for it appeared to be entirely dependant on alcoholism, or the dietary of the people. He was convinced that a local form of beriberi was present depending entirely on the food, and another form originating in something unknown, which cases ran frequently a rapid and fatal course. The military authorities in Brazil recommend for the troops—

- (1) A food ration rich in vegetables and fruit, and excluding polished rice ;
- (2) Avoidance of all sedentary punishments for prisoners ;
- (3) Isolation at once of all cases of beriberi as soon as it is diagnosed.

P. W. B.S.

**WILLIAMS (R. R.) & SALEEBY (N. M.). Experimental Treatment of Human Beriberi with Constituents of Rice Polishings.**—*Philippine Jl. Sci.* Sect. B. Trop. Med. 1915. Mar. Vol. 10. No. 2. pp. 99–119. With 2 plates.

In the treatment of beriberi, extracts of rice polishings have been distinctly beneficial in the infantile form but have given disappointing results with adults. The authors felt that a further effort was required to obtain a more widely useful remedy. Allantoin, a substance found in rice polishings, having given good results with fowls and in one case of infantile beriberi was experimented with. This can be synthetically prepared by the oxidation of uric acid with potassium permanganate, could be cheaply made, and its purity easily controlled. Ten cases of beriberi were treated with this substance by the authors and others ; the details of each case are given. Hydrolyzed and unhydrolyzed extracts of rice polishings were used in 17 cases and are also fully described. From these experimental cases they drew the following conclusions.

“Allantoin has a beneficial effect in certain cases of beriberi, although probably never amounting to a complete cure. Its value should be tested further.

“Hydrolyzed extract of rice polishings has benefited all the types of beriberi upon which it has been tried. It can be of practical service, but should be used only in cases under the direct supervision of physicians and nurses.

“Unhydrolyzed extract of rice polishings is a safe and valuable remedy for infantile beriberi, but is of little use for older cases.”

Though the vitamine of rice polishings possesses specific and prompt curative properties, its cost at present prevents its general use among the poor. The observations show that all cases of so-called beriberi result primarily from a poor diet deficient in vitamine, and that all the neuritis prevalent among the Filipinos, except certain definite cases due to other known causes, may safely be regarded as beriberi.

Two radiograms are given of a case of beriberi, showing the decrease in the cardiac shadow brought about by the use of vitamine obtained from 25 kilograms of rice polishings.

P. W. B.S.

ALBERT (J.). **The Treatment of Infantile Beriberi with the Extract Tiqui-Tiqui.**—*Philippine Jl. Sci. Sect. B. Trop. Med.* 1915. Jan. Vol. 10. No. 1. pp. 81-85.

In infantile beriberi the mortality among breast fed infants is greater than among those artificially fed, which is directly contradictory to what is found generally in other conditions. HIROTA considered that the disease was a true intoxication produced by the ingestion of beriberi milk and that to cure the disease it was necessary to discontinue the maternal feeding. In the Philippines among the poor this is impossible, as satisfactory artificial foods are difficult to supply. BRÉAUDAT and others have shown that rice polishings (tiqui-tiqui) and mongo given to the mother will bring about cure. The tiqui-tiqui is however very disagreeable to take and breast feeding has to be discontinued for a time. CHAMBERLAIN and VEDDER found the extract of tiqui-tiqui curative for polyneuritis gallinarum and recommended its use for infants; 5 cc. of the extract represents 82 grains of rice polishings and the dose advised is 5 cc. of the extract daily, given in 20 drop doses every two hours. The author has employed this method since 1912 and he states that it is of immense value in the treatment of the disease, being better than any known drug. The Philippine legislature in 1914 passed a bill providing money for the preparation and free distribution of the extract to the poorer classes. Sufficient time has not passed to give a definite report but the results have been very favourable. If given early it is followed at once by marked improvement; at the end of twenty-four hours the vomiting, restlessness, dysphagia, etc. all disappear as if by magic, and at the end of three days the disease is practically cured. If the case is severe, double doses should be given, but the extract must be continued as long as any aphonia remains. Beyond producing a little diarrhoea the extract is entirely uninjurious. Failures are due to (1) extreme severity of the case and too advanced a neuritis; (2) the disease being complicated with broncho-pneumonia; (3) improperly prepared extracts. The curative action is due to the supply of active nutritive elements, probably vitamins, which are deficient in beriberi milk. The extract is a vago-tropic drug, having a selective and specific action upon the vagus nerve, and supplying it with its much needed vitamins. If, as in severe cases, the neuritic degeneration has advanced far, no good effect is possible.

P. W. B-S.

SCHAUMANN (H.). **Neuere Ergebnisse de Beriberiforschung.** [Recent Results of Beriberi Investigation.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1915. Aug. Vol. 19. No. 15. pp. 394-418; No. 16. pp. 425-445.

The author gives a summary of our present knowledge of the subject of beriberi. The greater part of the paper relates to the etiology; he describes the three theories, infection, intoxication and dietary defects. The resumé of the results of the dietary experiments in man and animals is very full, but it contains no new work. There is a long list of the recent literature appended.

P. W. B-S.

**TADAHARU MARUYAMA.** **Changes in the Heart in Beriberi.**—*Trans. XIIIth Internat. Cong. Med.* Lond. 1913. Sect. III. Pt. 2. Gen. Path. & Path. Anat. pp. 81-86.

The author summarised the knowledge that had accumulated up to 1913 on the pathological findings in beriberi. He divides the paper into two parts, one dealing with the changes in the heart, the second with the nerve and muscle changes; the work done in his own country by YAMAGIWA, NAGAYO, and OYATA, being more particularly noted. He however disagrees with NAGAYO, who asserts that the change in the muscles correspond to that in the nerves and is in direct proportion to it, his own observations on man and animals showing no such parallelism. The cause of the nerve and muscular degeneration is probably some poison of the existence of which, as he states, there is as yet no positive proof—the view held by most Japanese clinicians and pathologists.

P. W. B-S.

**OTTOW (W. M.).** **Keuring, bewaring en behandeling van zilvervliesrijst (Bras pitjah koelit.)** [Examination, Preservation and Treatment of the Silver Skin of Rice.] [With summary in English.]—*Geneesk. Tijdschr. v. Ned. Ind.* 1915. Vol. 55. No. 2. pp. 75-131.

This long investigation on the curative power of the coverings of the rice grain, particularly the so-called silver skin, contains much experimental work. It is summarised in English under the following headings:—(1) The taste of unpolished rice, which is able to protect against beriberi, is not objectionable. (2) Compared with polished rice unpolished rice becomes easily and rapidly unfit for consumption. With ordinary care it cannot be kept longer than two months without perceptible alterations. (3) The preservation of this unpolished rice is best accomplished by the use of chloroform or carbon tetrachloride; these can be used in the form of vapour and comparatively small quantities are sufficient; they do not reduce the anti-beriberi properties of the rice. (4) The fixed amount of 4 per cent.  $P_2O_5$  is not sufficient to be relied upon when testing the rice. (5) A better method consists in the estimation of the spirit-dry residue according to a process fully described. This dry residue limit has been fixed between 0.55 per cent. and 0.6 per cent. (6) The physiological test with test animals is the only one that gives accurate results; the use of rice-birds in every respect deserves recommendation. (7) It is quite certain that requirements for an adequate activity of rice are quite worthless if certain stipulations are not made as to the treatment of the rice before it is consumed, namely in the washing and steaming processes.

P. W. B-S.

**OHLEK (W. Richard).** **Experimental Polyneuritis. Effects of Exclusive Diet of Wheat Flour in the Form of Ordinary Bread, on Fowls.**—*Jl Med. Research.* 1914. Nov. Vol. 31. No. 2. [Whole No. 147]. pp. 239-246.

A variety of neuritis or endemic beriberi is prevalent in Newfoundland and on the coast of Labrador, which has been ascribed by Dr. LITTLE

to the restricted diet on which the natives live, consisting mostly of highly milled wheat flour. A series of experiments was, therefore, carried out to observe the effects of an exclusive diet of wheat flour in the form of ordinary white bread. Thirty-one fowls were used, divided into groups in accordance with the exact method of feeding. From the result of these experiments the author established the following facts :—(1) An exclusive diet of white bread, whether with or without yeast, produces in fowls a definite polyneuritis; (2) If fed on an exclusive diet of whole wheat bread, the fowls remain perfectly well (5 fowls for 75 days). Fowls fed on hominy, made from the inside of the corn kernel, suffered like the ones fed on white wheat meal.

These results are in accord with the experiments reported by WELLMAN and BASS, when feeding fowls on various food stuffs, including sago, boiled white potatoes, corn starch, wheat flour, rice, etc. [this *Bulletin*, Vol. 2 p. 608], and they support the view of LITTLE that a restricted diet consisting largely of white bread is an important factor, if not the actual cause of beriberi in North Newfoundland and Labrador.

P. W. B-S.

WILLIAMS (R. R.) & CROWELL (B. C.). **The Thymus Gland in Beriberi.**—*Philippine Jl. Sci.* Sect. B. Trop. Med. 1915. Mar. Vol. 10, No. 2. pp. 121–125.

A diminution in size of the thymus gland has been noticed to occur in pigeons, suffering from polyneuritis and fed exclusively on white rice. FUNK proposed a theory that the vitamins of the food have a close relationship to the glands of internal secretion. The authors therefore carried out a number of experiments on fowls and man to see if administration of the thymus gland preparations had any curative effect. From these they conclude that (1) there is no apparent fundamental connection between beriberi and the atrophy of the thymus; (2) When the latter occurs in birds fed on polished rice it is due to some other cause; (3) The thymus contains no extraordinary amount of vitamin and the protective effect of administering the tissue is probably largely due to the purine and pyrimidine derivatives; (4) The presence of a comparatively large amount of thymus gland in young animals does not appear to be responsible for their modified susceptibility to beriberi.

P. W. B-S.

## MALARIA.

GILL (Clifford A.). **Report on Malaria in the Punjab. With Special Reference to its Prevalence amongst School Children.**—28+xiv. pp. With a map. 1915. Lahore: Supt. Govt. Printing, Punjab. [Price Rs. 2. 8. 0.]

The object of the inquiry, of which this publication forms the report, was to obtain information whether the spleen census of children inhabiting a large number of localities distributed through a Province like the Punjab afforded a reliable index of the distribution of malaria.

In the Punjab the investigations of CHRISTOPHERS showed that malaria prevailed in the autumn of 1908 to a serious and unusual extent throughout every district situated in the plains. In certain areas, termed by him "epidemic areas," the disease was well-nigh universal and caused a mortality of several hundreds per mille. In all the epidemic areas examined *shortly after* the epidemic the spleen-rate in children was exceedingly high, a rate of 50-90 per cent. being not uncommon.

The years 1909-1912 were marked by a steady decline in fever mortality and, so far as is known, a decrease in the prevalence of enlargement of the spleen amongst children. During 1909-1913 the autumnal fever mortality in the Punjab has been lower than that of any previous quinquennium since 1868.

In reviewing the question of the value of the spleen-rate in the measurement of malaria the author calls attention to the remarks made by Surgeon-Major DEMPSTER in 1847 which, in view of what we know at the present time of the etiology of malaria, serve to prove that this acute observer deserves to rank with BUCHANAN, ROSS, ROGERS, JAMES, CHRISTOPHERS and BENTLEY, who have done so much to bring about our present state of knowledge of malaria in India.

Surgeon-Major DEMPSTER wrote:—

"(1). The spleen-test forms an accurate method of estimating the salubrity of different malarious localities.

"(2). Great variations in the spleen-rate may be found in localities in close proximity to one another.

"(3). Young persons are more liable to the disease than adults, and the spleen test in the former is the more delicate test of malaria.

"(4). The degree of the enlargement of the spleen is most probably indicative of the intensity of the remote cause of the disease.

"(5). Marsh malaria is frequently less prevalent in large cities with high walls and smoky streets than in villages."

These main points enumerated by DEMPSTER have become a matter of common knowledge during recent years and, as the author remarks, it is difficult to realise that they were made in the absence of knowledge regarding the mode of transmission of malaria by anopheline mosquitoes.

As regards the method of carrying out the spleen census two principles were laid down:—

1. The medical examination of children for enlargement of the spleen must in all cases be conducted by a medical officer of not lower rank than a Sub-Assistant Surgeon.

2. The procedure must be so arranged that uniformity is ensured in regard to the class and number of children examined, the method of examination and the recording of results.

The result of the inquiry has been to establish that by means of the spleen census of school children it is possible to obtain reliable information regarding the endemology of malaria. The number of children examined in each locality was in most cases sufficient, while in large towns the measurement of the spleen rate of one or two schools yielded the same result as that produced by examining the children of all the schools. Another result of this investigation is to emphasise the manner in which malaria is subject to spontaneous variations of great magnitude in this Province, a spleen rate of 80 per cent. having become reduced to one of 1 per cent. in a period of six years. This fact therefore suggests the expediency of carrying out a periodical spleen census at least once a year. It is estimated that for a sum of less than Rs. 1,500 per annum a spleen census, sufficiently complete for all practical purposes, could be carried out without difficulty in all parts of the Punjab. It is believed that the above amount would suffice to obtain precise information of great value regarding the incidence of malaria throughout the Province and that this information, which furnishes the only reliable basis for the study of malaria over large areas, cannot be obtained within a reasonable period in any other way. It is thought that with minor modifications to suit local con-

ditions the scheme could be readily adopted for a similar purpose in other malarious tracts of India or other countries. Though in some localities the spleen rate has fallen from 80 per cent. to 1 per cent., in others there has been no such reduction. It is therefore important to determine the local conditions under which (a) great reductions in endemic malaria occur under natural conditions, (b) the spleen rate tends to become reduced at a slower rate and to a smaller degree. The importance of carrying out such an inquiry cannot be exaggerated for, in view of the natural tendency to the disappearance of malaria, it seems not impossible that a study of the conditions associated with this phenomenon would lead to the discovery of the means whereby the efforts of nature could be assisted so as to lead to the complete abolition of the disease in these areas.

C. M. Wenyon.

WALKER (Ernest Linwood). **The Transmission of Malaria in the Philippine Islands.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1915. Oct. Vol. 3. No. 4. pp. 222-227.

This paper is really a condensed account of the paper by the author and BARBER which was reviewed in this *Bulletin*, Vol. 5, pp. 337-9. The author again emphasises the necessity of complete information on the anopheline fauna of any region, the importance of knowing the kind of breeding places selected by the different species, and the necessity of determining experimentally the relative ability of the different species to transmit malaria. The subsequent investigations of BARBER (this *Bulletin*, Vol. 6, p. 325) showed that in the Philippine, malaria was always associated with *Anopheles febrifer* and that along the coast and in the regions devoted to the cultivation of rice, where *A. rossii* breeds abundantly, there was no malaria unless there were also shaded brooks and *Anopheles febrifer*.

In the discussion following the reading of the author's paper a question of synonymy was raised by Dr. C. S. LUDLOW, who explained

the origin of the name *A. febrifer*. Dr. LUDLOW first identified the mosquito as *A. funestus* Giles. Specimens of this mosquito were sent to Mr. F. W. EDWARDS of the British Museum, who identified it as *A. christophersi* Theobald. Meanwhile, however, Dr. LUDLOW had renamed it *Myzomyia flavirostris*. Mr. BANKS also in August 1914 renamed this species as *A. febrifer* so that the synonymy of the species becomes according to LUDLOW\*:

*Anopheles (Myzomyia) christophersi* Theobald.  
*alboapicalis* Theobald.  
*mangyana* Banks.  
*funesta* Ludlow non Giles.  
*febrifer* Banks.

C. M. W.

- i. DIBLE (J. Henry). **The Transmission of Malaria in Northern France.**—*Lancet*. 1915. Sept. 25. pp. 701-702; and *Jl. R. Army Med. Corps*. 1915. Nov. Vol. 25. No. 5. pp. 577-579.
- ii. REID (J. McG. H.) & HUMPHRYS (H. E.). **Malaria contracted in Flanders.**—*Brit. Med. Jl.* 1915. Oct. 23. p. 603.

i The paper records two cases of benign tertian malarial infection in two members of the British Expeditionary Force in French Flanders. In neither case had a journey abroad been previously taken, so that both must have been infected in France. It is interesting to note that one of the two men was stationed in a district which had previously been occupied by Indian troops, amongst whom recrudescant cases of malaria are comparatively common. It is evident therefore that infected mosquitoes now exist in France, in an area, moreover, which was previously free from the disease.

ii A record of six cases of benign tertian malarial infection, which appears to have originated in Flanders owing to the individuals having been stationed near Indian troops or troops returned from abroad. One of the cases reported is of special interest as the patient claims to have had his first attack in England after being stationed at Portsmouth and Bulford. After being in France one month the second shivering attack occurred and then similar attacks occurred daily for some time till the condition was diagnosed by blood examination.

C. M. W.

- CLARK (H. C.). **The Diagnostic Value of the Placental Blood Film in Aestivo-Autumnal Malaria.**—*Jl. Experim. Med.* 1915. Oct. 1. Vol. 22. No. 4. pp. 427-444. With 1 plate.

The investigations recorded in this paper were carried out at the Board of Health Laboratories at Ancon with a view to testing the value of examination of placental blood for evidence of malarial infection. At the end of labour some blood films were made from the peripheral blood of the mother by the physician in charge and these with the placenta were sent to the laboratories for examination. On arrival at the laboratories the cord was carefully cleared: it was cut across and films were made from the foetal blood. Films were also made from the maternal aspect of the placenta after removal of clots.

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\*See also this *Bulletin*, Vol. 6, p. 338 and note.



In this way it was possible to make a comparative examination of the peripheral blood of mother and foetus and the placental blood. In all 400 cases were thus examined, with the result that the placental blood showed infection in 19 cases, the maternal peripheral blood in 8 cases, and the blood from the cord in one case only. The placental films revealed malaria in 11 cases where peripheral blood was negative, while on the other hand the peripheral blood was never found positive without the placental film showing a much heavier infection.

Amongst the 400 cases there were 44 accidents (abortion, still birth, premature labour) and of these cases 7 were infected with aestivo-autumnal malaria. The total number of aestivo-autumnal infections amongst the 400 cases was 19, while of another 5 direct evidence of recent malarial treatment was obtained.

In most cases the first field of the placental blood film examined gave evidence of infection and in some cases this was so heavy that a fatal issue seemed certain for both mother and child, yet in all cases the mother lived and in nearly all cases the child also. In most cases of heavy infection of placental blood the peripheral blood of the mother only revealed parasites after tedious search. The commonest types of parasite found in the placental blood are the segmenting and presegmenting forms. Crescents were seldom found.

As regards the foetal blood only a single instance occurred in this series where an undoubted moderate infection existed at the time of birth. The mother's blood and the placenta bore evidence of a very heavy infection and there was a history of associated accident of pregnancy in relation to the placenta, so that it seems wise to attribute the infection to the placental accident. The observations bear out the view that under normal conditions the maternal and foetal bloods never come in contact with one another. It often seems incredible that a foetus can live where nutrition is derived from such heavily infected placental blood, yet in a remarkable number of cases (negroes at least) they do survive. In the words of the author "the placenta is one malarial battle-field over which the body holds the ruling influence, for by expulsion of the uterine contents the field and its contained enemies are quickly eliminated."

The paper is illustrated by a plate showing the types of parasite encountered in this investigation.

C. M. W.

JAMISON (S. Chaille). **Malarial Anaemia.**—*Southern Med. Jl.* 1915. Sept. Vol. 8. No. 9. pp. 758-760.

After an ordinary acute attack of malaria the anaemia which exists is of the secondary type, the red blood corpuscles and haemoglobin being reduced in equal proportions. After chronic malaria of some years' standing the picture is that of typical pernicious anaemia with high haemoglobin index, poikilocytosis, nucleated red cells and others seen in this type of anaemia. Patients may show this type of anaemia and have no malarial parasites in the blood on account of their having taken quinine continuously. If quinine is not taken for three weeks, the real nature of such cases is revealed by the appearance of parasites in the peripheral circulation.

In certain acute cases of malaria there is extreme anaemia both of the red cells and haemoglobin, with the absence of poikilocytosis, anisocytosis, polychromatophilia, and erythroblasts. These cases might be classed under acute aplastic anaemia.

C. M. W.

**BILLINGS (F.) & POST (W. E.). Fatal Malaria due to the Tertian Parasite.**—*Trans. Chicago Path. Soc.* 1915. Mar. 1. Vol. 9. No. 6. pp. 209–215. With 4 text-figs.

The paper describes a severe and fatal attack of cerebral malaria in a man 50 years of age, due exclusively to heavy infection with the parasite of benign tertian malaria. The blood when drawn for counting had a peculiar chocolate brown colouration, while sections of the tissues showed thrombi of parasites in the cerebral vessels and many plasmodia distributed in the capillaries of all the tissues examined.

C. M. W.

**HEARD (Wm. Haughton). Case of Malarial Fever with Motor Paralysis of the Legs.**—*Jl. Trop. Med. & Hyg.* 1915. Dec. 1. Vol. 18. No. 23. pp. 271–272.

The case described is one of mental dullness combined with motor paralysis of the legs in a native government porter in British East Africa. Blood examination showed sub-tertian malaria (crescents and rings) though the usual symptoms of such infection were absent. The patient quickly recovered under quinine treatment so that the author feels justified in describing it as a type of malarial infection of an unusual nature.

C. M. W.

**SALM (A. J.). Een geval van Malariapsychose.** [A Case of Malarial Insanity.]—*Geneesk. Tijdschr. v. Ned. Ind.* 1915. Vol. 55. No. 4. pp. 466–473.

A case of delusional mania occurring in a European soldier, who was found upon admission to hospital to be suffering from fever with tertian parasites in the blood. The fever was treated with quinine, and simultaneously the mental symptoms subsided, so that the author thinks that the two were in the relation of cause and effect. [The case lasted for about 10 weeks, namely from August 11th to October 23rd 1912, which is so very much in accordance with the usual duration of an attack of delusional mania, that it is perhaps possible that the relation was only one of coincidence. The mental symptoms seem to have been of a very ordinary character, having commenced with a threatened assault upon an unoffending person, followed by fear of robbery, refusal to eat, taciturnity and bodily restlessness, and finally complete amnesia, which passed off upon convalescence.]

J. B. Nias.

da MATTA (Alfredo A.). **Nevrite optica no decurso de meningite determinada por febre perniciosa palustre. (Nota clinica.)** [Optic Neuritis due to Meningitis arising in the Course of Pernicious Malarial Fever.]—*Arch. Brasil. de Med.* 1915. Aug. Vol. 5. No. 8. pp. 320-322.

Brief notes of a case of pernicious malarial fever in a boy aged 16, who was treated energetically with quinine in doses varying from 1 to 2½ grammes daily, administered hypodermically. Microgametocytes of *Laverania malariae* were found in the blood. The patient recovered perfectly after 13 days of illness, but for 5 days during the course of the illness there was temporary amaurosis. As the pupils were not dilated and reacted to light, the author attributes this symptom, not to the quinine, but to a meningitis due to the parasite. J. B. N.

BOSSELLINI (P. L.). **Distrofia aplasica ungueale malarica (solchi trasversali o di Beau).** [Transverse Furrowing of the Nails (Beau's sulci) in Malaria.]—*Giorn. Ital. d. Malat. Ven. e d. Pelle.* 1915. July 7. Vol. 56. Ann. 50. No. 3. pp. 255-266. With 1 plate and 2 text-figs.

A case of pronounced furrowing of the nails after a three weeks' attack of tertian ague, which was treated with quinine. A good illustration of the condition, which affected all the fingers of both hands, is given. The author points out that the lesion is essentially due to a temporary arrest of growth in that part of the nail which is developed from the Malpighian layer of the unguis sulcus, while the growth of the layer which develops from the bed of the nail is continued without interruption. A useful list of recent memoirs on the subject is appended. J. B. N.

MACGILCHRIST (A. C.). **The Relative Therapeutic Value in Malaria of the Cinchona Alkaloids—Quinine, Cinchonine, Quinidine, Cinchonidine and Quinoidine, and the Two Derivatives—Hydro-Quinine and Ethyl-Hydro-Cupreine. (Cinchona Derivatives Inquiry. Fifth Communication).**—*Indian Jl. Med. Research.* 1915. July. Vol. 3. No. 1. pp. 1-89. With 149 charts.

This is a long paper which records the results of investigations undertaken to test the value of certain alkaloids in the treatment of malaria. The author has already tested their toxicity on guinea pigs and their lethal action on infusoria with the result that if one takes the action of quinine as a standard the following conclusions can be drawn:—

"(1) Ethyl-hydro-cupreine is less harmful to guinea-pigs and more lethal to infusoria.

"(2) Hydroquinine is less harmful to guinea-pigs and equally lethal to infusoria.

"(3) Cinchonidine is less harmful to guinea-pigs but much less lethal to infusoria.

"(4) Cinchonine is somewhat more harmful to guinea-pigs but distinctly more lethal to infusoria.

"(5) Quinidine is more harmful to guinea-pigs and not quite so lethal to infusoria except in great dilution (1 in 100,000), and

"(6) Quinoidine is much more harmful to guinea-pigs and much less lethal to infusoria."

These results suggest that ethyl-hydro-cupreine and cinchonine might prove superior to quinine in anti-malarial power; that hydro-quinine might substitute quinine; that quinidine might be useful and that cinchonidine and quinoidine would prove of little value—particularly quinoidine on account of its toxicity to mammals. The present paper has to do with the clinical application of these results.

The test was carried out in two large jails at Alipore—the Presidency Jail and Alipore Central Jail.

Quinine, quinidine, cinchonine, and cinchonidine were administered in the form of the sulphate; ethyl-hydro-cupreine and hydroquinine in the form of the hydrochloride; and quinoidine was dissolved in a little rectified spirits and diluted with glycerine. All were given in solution and exclusively by the mouth. A dose was given every eight hours and the amount administered was directly in proportion to the man's weight, a precaution which does not appear to have been followed in previous tests of this kind. A blood film was made every eight hours, at the time of administration of the drug, and the disappearance of the parasites noted. A further precaution taken was the preparation of the patient for absorption of the drug by the administration of a dose of calomel immediately after admission.

The total number of malarial cases tested was 149 as shown in the following table :—

TABLE III.

	Total experimental cases.	Benign tertian infection.	Malignant tertian infection.	Quartan.
September ..	14	5	9	0
October ..	39	27	11	1
November ..	60	30	28	2
December ..	36	11	21	4
	149	73	69	7

Of this number 71 had enlargement of the spleen. The experiment was conducted in three series.

In the first series 72 cases were treated with one of the four alkaloids—quinine, quinidine, cinchonine and cinchonidine—in the form of sulphate obtained from the Government factory at Mungpoo near Darjeeling. The dosage was at the rate of 1 gram per 70 kilos of body weight. The chief point to be noted was that in every case and in all types of malaria nine doses of the four alkaloids were sufficient to cause the disappearance of the asexual forms of parasite, and that even in the case of benign tertian infection in some cases it required the full nine doses to bring about this result.

The second series of experiments was undertaken with a view to determining the minimal effective dose of quinine in the three types of malarial infection. The drug was given to a series of patients, each successive patient receiving a smaller and smaller dose, till a dose was reached which failed to cause the disappearance of the parasites from the peripheral blood. By determining the minimal effective dose of quinine it would be simple, by giving the other alkaloids in the same dosage, to determine their therapeutic value relative to that of quinine.

The result of the second series showed that the minimal effective dose of quinine was .1 gram per 70 kilos of body weight for the benign tertian parasite, .15 gram for the malignant and .2 gram for the quartan parasite.

The third series of experiments was undertaken on 61 cases. The dosage used was that obtained as a result of the second series and in addition to the drugs used in the first series there were also employed quinidine, hydroquinine and ethyl-hydro-cupreine. The results obtained are shown in a series of tables which must be consulted for details of the observations. The drug was administered every eight hours and continued while the patient remained in hospital. The time of disappearance of the asexual forms of the parasite was noted. The results of the first and third series of experiments are illustrated in Table XXXIII, which is reproduced here.

TABLE XXXIII.

## A.

Average total amount of alkaloid in grammes per 70 kilo. administered before asexual parasites disappeared from the peripheral blood.

	Large Doses. (First Series.)			Small Doses. (Third Series.)		
	Benign Tertian.	Malignant Tertian.	Quartan.	Benign Tertian.	Malignant Tertian.	Quartan.
Quinine ..	4.7	6.1	9	.74	1.16	..
Cinchonine ..	5.5	5.6	9	.8	1.03	..
Quinidine ..	5.0	*4.85	..	*.92	1.32	..
Cinchonidine	5.6	*4.3	..	..	..	..
Hydroquinine	..	..	..	.65	.88	*1.97
Ethyl-hydro- cupreine	..	..	..	*.66	1.78	*2.5
Quinidine ..	..	..	..	1.08	2.5	*1.6

## B.

Average number of doses required before asexual parasites disappeared from the peripheral blood.

	Large Doses (First Series.)			Small Doses (Third Series.)		
	Benign Tertian.	Malignant Tertian.	Quartan.	Benign Tertian.	Malignant Tertian.	Quartan.
Quinine ..	4 $\frac{2}{3}$	6 $\frac{1}{3}$	9	7 $\frac{1}{2}$	8 $\frac{1}{2}$	..
Cinchonine ..	5 $\frac{2}{3}$	5 $\frac{2}{3}$	9	8	7	..
Quinidine ..	5 $\frac{1}{2}$	*5	..	*9	9	..
Cinchonidine	5 $\frac{3}{4}$	*4 $\frac{1}{2}$	..	..	..	..
Hydroquinine	..	..	..	6 $\frac{1}{2}$	5 $\frac{3}{8}$	*10 $\frac{1}{2}$
Ethyl-hydro- cupreine ..	..	..	..	*6 $\frac{1}{2}$	12 $\frac{1}{2}$	*13
Quinidine ..	..	..	..	10 $\frac{3}{4}$	16 $\frac{3}{4}$	*8

\* See note at foot of Table C.

## C.

Average number of hours before asexual parasites disappeared from the peripheral blood.

	Large Doses (First Series.)			Small Doses (Third Series.)		
	Benign Tertian.	Malignant Tertian.	Quartan.	Benign Tertian.	Malignant Tertian.	Quartan.
Quinine ..	37	49	72	60	65	..
Cinchonine ..	45	46	72	64	56	..
Quinidine ..	42	*39	..	*72	72	..
Cinchonidine	46	*35	..	..	..	..
Hydroquinine	..	..	..	51	47	*84
Ethyl-hydro- cupreine ..	..	..	..	*52	98	*10
Quinoidine ..	..	..	..	86	133	* 6

\*“ The figures marked with an asterisk are based on very few experiments and so are not so reliable as the others.”

The relative therapeutic value of the alkaloids is determined from the figures in the small dose columns in the table. It will be noted that hydroquinine gave far the best results both in benign and malignant tertian infections ; that cinchonine, quinine, and quinidine come next ; ethyl-hydro-cupreine gave very disappointing results, while quinoidine was least effective of all. A calculation made from the table gives the following quantities of drug per 70 kilos of body weight required to rid the body of the asexual forms of the benign tertian and malignant parasites :—

Hydroquinine .. ..	765 gram.
Cinchonine .. ..	915 „
Quinine .. ..	95 „
Quinidine .. ..	1·12 „
Ethyl-hydro-cupreine ..	1·22 „
Quinoidine .. ..	1·79 „

The cases of quartan infection were so few that definite conclusions are not justified.

The relative frequency of by-effects such as nausea, cinchonism, etc., is discussed. Quinine and quinidine affect the ears more than do any other alkaloid, cinchonine coming next ; vision is affected chiefly by quinine and cinchonine, while the latter is liable to cause diarrhoea if continued in large doses for more than a week. Even in large doses cinchonidine caused no unpleasant by-effects. In large doses quinidine was the most nauseating, cinchonine and quinine coming next.

It is noted that of the 149 patients under experiment seven had no fever throughout the period : five of these were benign tertian infections and two malignant. These afebrile malarial patients are “ carriers ” of malarial infection. Hyperpyrexia is not peculiar to any special variety of parasite, but is most frequent in sub-tertian infections. Typical tertian infection temperature charts, i.e., charts showing fever on alternate days, are few in number and are quite as frequent in malignant as benign infections.

In benign tertian and quartan infections sporulating forms become very rare after two or three doses of medicine. The time that elapses between defervescence or disappearance of fever and disappearance of asexual parasites from the peripheral blood varies from nil to three or even four days.

A case is mentioned of a Punjabi who was admitted to hospital with a malignant tertian infection. No treatment was given and the patient recovered in five days, an illustration that "spontaneous cure" occurs sometimes and may introduce a slight error into experiments of the kind described in this paper.

Observations were made upon patients who had crescents in the blood. Only large doses of drug were employed. It resulted that the order of effectiveness of the alkaloids was much the same as that against the asexual parasites, hydroquinine being the best. The experiments also show that the alkaloids are able to check crescent formation. If therefore the treatment be continued during the natural life span of a crescent—it is said to be about three weeks—crescents will disappear from the blood.

Relapses occurred in 8 per cent. of the cases treated. They varied with the different alkaloids, but here again hydroquinine, cinchonine and quinine gave the best results.

As regards the hydroquinine used in the experiments the author explains that it is a derivative of quinine prepared synthetically by Zimmer & Co., Frankfort-on-Main; it is a reduced product, its molecule containing two atoms of hydrogen more than that of quinine, the additional hydrogen being linked to the vinyl side-chain of quinine, the vinyl becoming thereby an ethyl group. The price charged by Zimmer & Co. was four shillings and ninepence an ounce. It exists naturally in small quantity in Cinchona bark and is contained in the mother liquor from which quinine sulphate crystallises as well as in commercial sulphate, sometimes to 4 per cent. It differs from quinine in only very slowly decolourising a solution of potassium permanganate. Heated with strong hydrochloric acid at  $140^{\circ}$  C. it loses a methyl group and is converted into hydro-cupreine.

The Cinchona Febrifuge of the Mungpoo Factory was found by WATERS to be equal to quinine weight for weight. This mixture contains 48.81 per cent. of quinine, quinidine and cinchonine. The Residual Alkaloid of the same factory contains a higher percentage of these three alkaloids, namely, 58 per cent. These alkaloids being the principal active agents, the Residual Alkaloid should be more potent than the Cinchona Febrifuge.

Certain improvements in the manufacture of Cinchona derivatives are indicated:—

- "1. To obtain a bark containing as little quinidine as possible.
- "2. To extract quinine for use as such and for the manufacture of hydroquinine.
- "3. To issue the remaining alkaloids as residual alkaloid, which should contain as little quinidine as possible but have a high percentage of quinine, cinchonine and quinidine combined."

The long and interesting paper concludes with a series of temperature charts of the cases subjected to the experimental tests.

C. M. W.

BOYD (Hugh). **The Administration of Quinine in Malaria.**—*Southern Med. J.* 1915. Sept. Vol. 8. No. 9. pp. 753-758.

On account of its solubility and the rapidity of its absorption the bimuriate of quinine is the best preparation to use when a quick effect is desired and it is to be used intramuscularly and intravenously to the exclusion of all other salts. It can often be given to patients in whom the sulphate produces urticaria. The hydrobromide and ethyl carbonate will often act well on patients in whom the sulphate produces gastro-intestinal or nervous symptoms. Quinine should always be given to children in solution. The best preparation is probably the ethyl carbonate in simple syrup in doses of  $\frac{1}{2}$  to 3 grains. The tannate is also quite tasteless and can be given in chocolate confections or syrup.

The author gives it as his experience that when the capsules are not absorbed it is best not to trust quinine in the stomach but to give it intramuscularly. The strength should never be greater than  $\frac{1}{2}$  gram to 10 cc. of water. The author uses 5 grains of bimuriate of quinine dissolved in 3 drams of boiling water. Quinine may be given by the rectum. The bimuriate is found in the urine 30 to 35 minutes after being given per rectum in dilute solutions.

The author writes very emphatically against the single large doses of quinine. If a patient is seen a few hours before a paroxysm 6 to 8 grains are given at once followed by 3 grains every three hours or 4 grains every four hours. In some cases, if the stomach will tolerate it, 10 to 12 grains are given at once, 5 grains two hours later followed by the smaller doses at three or four hour intervals. The quinine should be kept up in this manner for 40 to 70 hours after fever has subsided, when the dose can be halved for several days and then 10 grains given every other day for two or three months with a dose of 15 grains instead of 10 once a week. Cases of malaria which demand more than 30 grains of quinine in 24 hours and a larger initial dose than 10 grains are very rare.

In chronic malaria 16 to 24 grains of quinine are given every sixth and seventh day for two and a half to four months, always giving 3 to 5 grain doses every 3 to 4 hours.

In pernicious malaria the author resorts to oral administration if he can, to the intramuscular injections if he must, and often to both. In these pernicious cases it is necessary to give quite a large initial dose, 10 to 15 grains intramuscularly, and to repeat by half every 6 to 10 hours as required. The author states quite definitely that in the treatment of haemoglobinuric fever quinine has no place. A few cases occur without the previous administration of quinine but most of them follow it.

C. M. W.

HOLST (M. K. T.). **Symposium: Malarial Fever, its Prevention and Cure.**—*Med. Missions in India.* 1915. Oct. Vol. 21. No. 83. pp. 129-136.

The paper contains remarks on the treatment of malarial fever by Drs. HOLST (Mardan), TURNER (Bandawe, Nyasaland), PRENTICE



(Kasungu, Nyasaland) and CARR (Inuvil, Ceylon). All write of having employed the subcutaneous or intramuscular method of quinine administration with advantage.

C. M. W.

STOTT (Hugh). **Tetanus and Hypodermic Quinine.** [Correspondence.] —*Indian Med. Gaz.* 1915. Nov. Vol. 50. No. 11. pp. 433.

In the form of a letter to the Editor the writer replies to the criticism of Lieut.-Colonel Henry SMITH and Major Clayton LANE, who raise the question of tetanus resulting from injections of quinine as an argument against this method of its administration. The writer claims that no such infection can arise unless there is some fault in technique and even the formation of a painful node is regarded in his practice as evidence of some defect in the method of injection.

C. M. W.

LYONS [(Randolph). **The Failure of Intravenous Mercuric Chlorid in the Treatment of Malaria.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1915. Oct. Vol. 3. No. 4. pp. 243-245.

This paper records the results of a trial of the method of treatment of malaria by intravenous injections of mercuric chloride, as advocated by BARLOW [this *Bulletin*, Vol. 6, p. 335]. Three cases of aestivo-autumnal infections were selected and it was found that injections of bichloride of mercury are not efficient and are far inferior to quinine. The type of infection selected for experiment gives a fairer test of the real value of any specific medication than the simple tertian form, which is easily influenced by extrinsic factors.

C. M. W.

VENDENHOFF. **Neosalvarsanbehandlung bei 15 Fällen von Malaria tertiana.** [Treatment by Neosalvarsan in 15 Cases of Benign Tertian.]—*München Med. Woch.* 1915. Oct. 26. Vol. 62. No. 43. pp. 1456-1457. With 6 curves.

The author has treated fifteen cases of benign tertian malaria occurring in Russian prisoners in Germany by means of intravenous injections of neosalvarsan. In each case the dose was '6 gram in pure distilled water. The injections were made shortly before the onset of fever and in all cases the next fever attack did not occur. Of the fifteen cases treated eight had no relapse. In four of the cases of relapse after three to twenty-four days parasites reappeared in the blood at the time of recurrence of fever. Three cases relapsed after a second injection, which necessitated the administration of a larger dose of '9 gram of the drug.

Neosalvarsan has the advantage of acting more quickly than quinine and can be used in those cases in which quinine has no action. The author mentions a case of quartan infection seen by him in 1914 on the line of the Bagdad railway, which was treated with two injections of neosalvarsan ('6 and '9 gram) without any good result, though the subsequent administration of quinine effected a cure.

C. M. W.

ZIEMANN (H.). Ueber eigenartige Malariaparasitenformen. [Special Forms of Malarial Parasites.]—*Cent. f. Bakt.* 1. Abt. Orig. 1915. July. Vol. 76. No. 5. pp. 384–391. With 1 plate.

The author gives a list of the characters which distinguish the two varieties of the malignant malarial parasites which he recognises. The one, *Plasmodium praecox* (Grassi and Feletti), syn. *P. immaculatum*, *P. falciparum*, is the type common in Italy and most tropical countries; the other, *Plasmodium perniciosum*, is of West African origin. The first is distinguished from the second by:—

1. Small quantity of pigment.
2. Higher colour of pigment.
3. Complete disappearance from the peripheral blood after segmenting stage is reached.
4. Want of "brassy tint" of infected cells.
5. Schizonts occupy only  $\frac{1}{3}$ – $\frac{1}{2}$  diameter of red cell and merozoites are few (12–16).
6. Less inclination to crescent production.
7. Crescents when produced are smaller and plumper.
8. The free spheres (gametocytes) of this form resemble those of the ordinary benign tertian parasite but are only  $\frac{1}{2}$ – $\frac{1}{3}$  the size of these.

For practical purposes the recognition of the two varieties of the malignant parasite is of little value.

Mention is made of two cases seen by the author in Cameroon, in which the parasites were remarkable in the extraordinary development of the chromatin. As these were only seen twice in thousands of examinations and as in these cases there were other factors at work, the author concludes that they were accidental variations of the usual form. The examination of films from Formosa convinces the author that here also is to be found the type which he describes as *Plasmodium perniciosum*.

The peculiar forms of malignant parasite described by BALFOUR in the Third Report of the Wellcome Research Laboratories in Khartoum are next considered and he is of opinion that insufficient data for a correct diagnosis are available. In reference to the "so-called *Plasmodium tenue* of Stephens" he points out that it appears to resemble BALFOUR'S Khartoum parasite, a resemblance which the describer of *P. tenue* has overlooked. Here again he considers the data insufficient and cannot accept *P. tenue* as a good species.

[The author is apparently unaware of the paper by BALFOUR and WENYON on these parasites [this *Bulletin*, Vol. 5, p. 53] and that LAVERAN first used the specific name for a parasite of a Japanese bird, which is the true *P. tenue*.]

The *Plasmodium vivax* var. *minuta* described by EMIN is next considered. It was discovered in the blood of pilgrims on Camaran Island in the Red Sea. The peculiar features of this parasite, as given by EMIN, are:—

1. Very active amoeboid movements.
2. No enlargement or paling of the red cell.
3. Occurrence of Schüffner's dots which may take on the form of filaments.

4. Commencement of nuclear division when the parasite is only half the size of the red cell.
5. Schizogony in the peripheral blood with 4-10 merozoites. The schizont is only  $\frac{2}{3}$  the size of the red cell.
6. Only slight pigment development even at the end of growth. The pigment with the greater part of the cytoplasm remains as a residual body.
7. The gametocytes are round and attain a size of  $\frac{3}{4}$  that of the red cell.

Owing to the kindness of MARCHOUX the author has been able to examine some of EMIN's films and he comes to the conclusion that the parasite is not merely a variety, as EMIN thought, but a good species and he gives it the name *Plasmodium camaranense*. He mentions several further distinguishing features of this parasite. The chromatin is well marked even in young forms and may be twice the amount usual in malignant parasites. In ring forms the chromatin is often within the ring and it early splits into two or three separate parts. Not infrequently it is seen in the form of rods, hooks or rings as in the form described by STEPHENS. Nuclear division is generally clearly marked when the parasite is only  $\frac{1}{4}$ - $\frac{1}{3}$  the diameter of the red cell.

The cytoplasm is in the ring form only in the youngest stages. It then assumes a rather remarkable irregularity of shape and form. In older forms, which never reach more than  $\frac{4}{5}$  the cell diameter, it is often difficult to see a clear outline in 50 per cent. Multiple infection of red cells is common. There do not appear to be ever more than 12 merozoites. The pigment is very fine, even in half-grown forms, but when nuclear division has commenced it becomes more evident as there appear one or more dark brown granules. In the infected cell no true Schüffner's dots are seen, at any rate as they occur in the case of benign tertian infections and in deeply stained quartan infected blood. On the other hand there occur the rods and filaments which are more like Maurer's dots and are undoubtedly the markings described by EMIN as Schüffner's dots. The red cells, as EMIN stated, are not enlarged. The female gametocytes can be distinguished from the male by the deeper colour and more peripheral nucleus.

C. M. W.

SWELLENGREBEL (N. H.). **Over de schizogonie van de Quartan-parasiet (*Plasmodium malariae*).** [The Schizogony of the Quartan Parasite.] [With German summary.]—*Geneesk. Tijdsch. v. Ned. Ind.* Vol. 55. No. 1. pp. 1-9. With 1 plate.

This paper, which is illustrated by a coloured plate, describes two types of schizogony of the quartan malarial parasite, one of which appears to commence in a parasite showing all the features of a male gametocyte and the other those of a female. Whether this has to do with a parthenogenesis and thetogenesis the author is not prepared to state. In both of these the chromatin can be distinguished as two distinct substances, the one staining a deep red and the other a pale red. The latter often serves as a ground substance or support for the former.

C. M. W.

**BIGLIERI (R.). Ueber spontane Hämagglutination bei Malaria.—Wien. Klin. Woch.** 1915. Sept. 30. Vol. 28. No. 39. p. 1054.

The author, writing from Tucuman in the Argentine, has examined 600 cases of malaria for auto-agglutination of the red blood corpuscles, a phenomenon which is common in trypanosome infections. A positive result was obtained in 158 cases. Of the benign tertian cases examined 55 per cent. were positive, of the quartan 55 per cent. and of the subtertian 63 per cent. No such auto-agglutination was observed in cases of tuberculosis or enteric, but occasionally it is noted in puerperal septicaemia and pregnancy.

C. M. W.

**COLE (James Clifton). Malaria and Carriers of Malarial Infection.—New Orleans Med. & Surg. Jl.** 1915. Nov. Vol. 68. No. 5. pp. 311-314.

The author discusses the question of malaria prevention from the three points of view: Malaria, Mosquito and Man. He shows that, though scientific sanitation has done much and is destined to do much more, mosquitoes are here for many years to come and man for always, and that one should direct one's energies and attention towards man, especially the chronically infected and potential carrier. He does not advocate the discontinuance of the war upon the anopheles: they are pests apart from being carriers of disease, but the campaign against them means the outlay of enormous sums of money and expenditure of time, all of which is of little avail. The author's advice is to diagnose the case of malaria, disinfect the blood of every probable carrier, isolate and treat known cases and in a few years malaria will be a rare infection, even in the presence of anophelines. [The author probably has in mind a community with a large white element.]

C. M. W.

**CARTER (Henry R.). Memoranda from Malarial Surveys and Demonstration Work.—Southern Med. Jl.** 1915. Sept. Vol. 8. No. 9. pp. 750-753.

The author draws attention to the use of sawdust as a material for filling holes which may become breeding places for mosquitoes. In the neighbourhood of sawmill villages, where there is abundance of sawdust, its use for this purpose affords the cheapest and most effective means of carrying out this work.

He finds that anti-malarial campaigns are much more easily carried out in industrial communities, in which the bulk of the population is engaged in a few large industries, than in the ordinary commercial town with diversified occupations and interests.

C. M. W.

**HENÃO M. (E.). Ferrocarril de Antioquia. Departamento Medico. Informes sobre Sanidad.** 1915. 46 pp. With 2 plans.

A report from the medical superintendent of the sanitary department of the Antioquia Railway, Colombia, containing recommendations for the improvement of the sanitary conditions at various important

stations on the line. Full prominence is given to the prevention of malaria amongst the employees by means of a systematic distribution of quinine, along with the drainage and petrolisation of all pools and other collections of standing water in the vicinity of the line. The chart at the end of the report shows very clearly the satisfactory result of such measures at the important station of Cisneros. From a monthly sickness rate, from malaria alone among the employees of approximately 11 per cent. in the years 1910 and 1911, the figure had fallen to zero by the middle of the present year, 1915.

J. B. N.

MESSORE (Luigi). *Relazioni della campagna antimalarica nel territorio di Marclanise nell' anno 1913.*—*Malariologia*. 1915. Oct. 15. Vol. 8. No. 5. pp. 119–129. With 1 map.

The district of Marcianise (province of Campania, Italy) presents a special difficulty with regard to the prevention of malaria from the existence of large numbers of tanks in which hemp is steeped during the summer months for the preparation of the fibre. During the process of steeping the water becomes too foul for the breeding of Anopheles, but in the early part of the season these receptacles form pits for rain water. The problem of dealing with these pits, and also with the migratory labourers who come to work at the preparation of hemp in their immediate neighbourhood, is discussed in the present paper.

J. B. N.

MALARIOLOGIA. 1915. Aug. 15. Vol. 8. No. 4. pp. 73–115. With 1 plate.

This number of *Malariologia* is entirely given up to a collection of funeral addresses and other expressions of esteem and regret, which were uttered upon the occasion of the death of Professor Angelo CELLI in November, 1914. Professor CELLI was buried at Frascati, near Rome, on a site overlooking the Roman Campagna, which was one of the principal scenes of his labours.

J. B. N.

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## BLACKWATER FEVER.

STEPHENS (J. W. W.). **Studies in Blackwater Fever. IV.—Note on a Case of Quartan Malaria associated with Blackwater Fever.**—*Ann. Trop. Med. & Parasit.* 1915. July 31. Vol. 9. No. 3. pp. 429–433. With 1 chart.

A case of blackwater fever in a European who had resided for four years in West Africa. Three days before the onset of the blackwater he was admitted to hospital for fever, and showed a scanty quartan infection. The rise in temperature at the time of onset of the symptoms of blackwater corresponded to the time of the next paroxysm due to the quartan parasite. No malarial parasites were found after the onset of symptoms of blackwater. Malarial pigment was found in the organs at the post-mortem examination.

C. M. Wenyon.

BURKITT (R. W.). **Blackwater Fever.**—*Lancet.* 1915. Nov. 20. pp. 1138–1140.

The author gives it as his experience that the urine in blackwater fever cases is highly acid and contains acetone, indicating a diminished alkalinity of the blood. On this account he has treated his cases in British East Africa with blood alkalinisers—calcium chloride and potassium or sodium bicarbonate. The results have been very good; in some cases there have been remarkable recoveries and in others, where blackwater fever has seemed to be imminent, the administration of the alkalies has warded off an attack.

Patients may recover from the blackwater and still harbour malarial parasites in spite of quinine treatment. These quinine resistant parasites should be destroyed by an intravenous injection of neo-salvarsan, as advocated by the late Prof. EHRLICH.

When the blood is in a condition of acid poisoning, the administration of quinine may act as “the last straw” and bring on an attack of blackwater, whereas if the acid is neutralised first by administration of alkali, quinine or neo-salvarsan can be administered without danger. In one case mentioned the administration of neo-salvarsan without the preliminary neutralisation of the blood by alkali brought on an attack of blackwater.

C. M. W.

FORSYTH (Charles E. P.) & JAMESON (Ernest T.). **Blackwater Fever : Notes on Three Consecutive Cases.**—*Indian Med. Gaz.* 1915. Nov. Vol. 50. No. 11. pp. 416–417.

The paper records three cases of blackwater fever in Europeans. In one case the person attacked had only been in India eight months. During convalescence malarial parasites were found in all three cases, two having benign tertian infections and one subtertian. All had taken quinine very irregularly before the attacks and in one case an excessive dose of quinine seems to have caused the onset. During

the convalescence of the patient who had been in India only eight months there developed a very severe subtertian infection, which was only brought under control by repeated hypodermic injections of quinine. The authors mention five other cases of blackwater fever treated by them in Indians of the educated class and record the observation of Dr. WEST of Bishnauth of a case of the disease in a native coolie.

C. M. W.

LAHILLE (Abel). **Deux Cas de fièvre bilieuse hémoglobininurique observés en Cochinchine.**—*Bull. et Mém. Soc. Méd. des Hôpît. de Paris.* 1915. Nov. 4. 3 ser. Vol. 31. No. 31-32. pp. 905-917.

A description of two cases of haemoglobinuric fever in Cochin China. One case was fatal and the other recovered. In both cases a detailed account is given of the treatment and of the results of examination of the blood and urine. It may be noted that in the severe case there was a great variation in the composition of the blood from time to time. The chlorides may be 3.27 grams per litre of blood and the urea 5.77 grams; the hydraemia may be extreme with 145 grams of serum to 35 grams of clot; the albumin varied from 82.7 grams per litre of serum on the day before death to 78.9 grams four days earlier. The injection of iso- or hypertonic saline solutions intravenously or subcutaneously did not seem to alter the chlorides in the serum, though in the benign case a temporary rise was effected by this treatment.

These observations do not support the view that a deficiency of the mineral element in the blood is a cause of the disease. The quantity of bile pigment in the blood was in direct proportion to the severity of the case.

C. M. W.

SALÓM (C. E.). **Prehemoglobinuria febril. (Apreciaciones Clínicas)** [Febrile Pre-Haemoglobinuria.]—*Gaceta Med. de Caracas.* 1915. Sept. 15. Vol. 22. No. 17. pp. 134-136.

By the above name the author would distinguish a febrile condition intermediate between ordinary malaria and true blackwater fever, which is characterised by rigors, bilious vomiting, albuminuria, pain in the back and jaundice. This condition, which in the opinion of the author amounts to a distinct pathological entity, is to be met with in various malarial districts of Venezuela. It occurs only in persons who have been subject to malarial attacks and are exposed in addition either to chill, or to alcoholic excess, or to venereal excess, or any other depressing agent which may be supposed to influence the nervous system. A slow extension of the malarial poison to the sympathetic nervous system may be supposed to affect the vaso-motor control to such an extent that the various phenomena constituting the condition may arise. The term "Icteroideta" having been coined by Professor MACHADO for yellow fever, the author thinks that the complex of symptoms which he describes may be suitably termed "Icteroideta paludica."

J. B. Nias.

**BIJON (Raymond).** *Étude expérimentale chez l'homme de l'influence de la quinine dans la pathogénie de la fièvre bilieuse hémoglobino-urique.*—*Bull. Soc. Path. Exot.* 1915. Oct. Vol. 8. No. 8. pp. 597-604.

As a result of investigations conducted on two cases of haemoglobinuric fever the author makes the following deductions:—

1. There is a diminution of the resistance of the red blood corpuscles and there exists a lysin in the blood (autolysin).
2. The lysin comes into action owing to a failure of the body to produce the necessary anti-lysin.
3. Quinine has an action on the lysin either by saturating it or perhaps indirectly by destroying malarial parasites.
4. Quinine cannot have any effect on the progress of haemoglobinuric fever but only on its etiology, by accidentally precipitating the onset in an individual who is already in a state of malarial intoxication and will almost certainly have an attack later even without the administration of any quinine.

C. M. W.

**GASBARRINI (A.).** *Studi sulla malaria. (VII)—Contributo allo studio dell'emoglobinuria da chinino nella malaria.* [Contribution to the Study of Quinine Haemoglobinuria in Malaria.]—*Malaria e Malat. d. Paesi Caldi.* 1915. May-June. Vol. 6. No. 3. pp. 115-130.

A study of a case of haemoglobinuria in a patient the subject of tertian ague. The symptoms came on after taking a gramme of quinine. The patient recovered after a stay of two months in hospital, during which time his blood was repeatedly tested for autolysins by the methods of De BLASI and DONATH and LANDSTEINER, the results being shown in a table. The presence of autolysins could be constantly demonstrated in the red cells, but not in the serum. DONATH and LANDSTEINER's test only gave a positive result when the serum was mixed with an equal quantity of salt solution containing 0.02 per cent. of hydrochloride of quinine. For further details reference should be made to the original paper.

J. B. N.

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## TYPHOID AND PARATYPHOID IN THE TROPICS.\*

HARVEY (D.). **The Causation and Prevention of Enteric Fever in Military Service, with Special Reference to the Importance of the Carrier. Being an Account of Work done at Naini Tal Enteric Depot, 1908-1911.**—*Jl. R. Army Med. Corps.* 1915. June. Vol. 24. No. 6. pp. 491-508; July. Vol. 25. No. 1. pp. 94-120; Aug. No. 2. pp. 193-214.

Col. Harvey holds that "all cases of enteric fever (and under this term are included the paratyphoid fevers) in military service are caused by contact with infected persons, either direct or indirect"; i.e., taking "carrier" to mean all infected persons or bacillary excreters, by carriers. In civilian life he is prepared to admit the operation of other causes, but in military life in India he believes the importance of the carrier to be supreme. This he supports by numerous instances where carriers have undoubtedly been the source not only of small explosive epidemics but also of endemic incidence over considerable periods of time. Flies, whether faecal bred or as mechanical transmitters, he regards as of comparatively little importance. The essence of prevention, therefore, is the unearthing and care of carriers.

This has been rendered possible by the effects of inoculation, to which he is convinced that the decline in the enteric in the Indian Army is largely due. No doubt there have been changes for the better in sanitation, but he maintains that these have been in no way radical and cannot fairly be held to account for the great fall in typhoid incidence. Paratyphoid, against which typhoid inoculation is no protection, has not fallen in consequence of the changes. They may be held to account for the fall in the cholera-rate which took place in the 1891-1900 period as compared with the 1862-1870 period, but the enteric rate actually rose in the later period to double what it had been in the earlier. The cause lay not so much in defective sanitation as in the prevalence of the carrier.

In 1906 investigation was begun at Meerut, at first by the examination of healthy men for carriers, and later (since this involved enormous labour for very small result) by the examination of cases during their convalescence. This showed that of 86 men, 10 (or 11.6 per cent.) passed typhoid bacilli for over six months after defervescence, though only two developed into true chronic carriers. In consequence it was decided to establish depots, to which all convalescents from enteric should be despatched and regularly examined, and where they might be detained for three months, or longer if they remained infective. The procedure naturally varied as time went on, and there were various extrinsic hindrances to a complete routine, but each man, at all events later, was examined daily for a week on arrival and again for two weeks before leaving the depot. Carriers who become chronic usually excrete persistently in the earlier months, though they may later intermit, and the week's examination at first was a useful test, allowing few carriers to escape notice. Details are given of the methods of examination, and tests were made on the opsonic, bactericidal &c. powers of the sera in many cases.

\*Many of the summaries in this Section are not really covered by the title; it is thought useful at the present time to publish them.

Quite frequently these examinations yielded bacilli which behaved like paratyphoid A on lactose, mannite, glucose, saccharose, milk and absence of indole, and were agglutinated by high titre serum, yet did not absorb the agglutinins out of the serum, and were therefore not regarded as being true paratyphoid A. Similar organisms resembling typhoid were met with, and it was rare for a day to pass without encountering one of these "simulating" bacilli.

As the result of some experiments on the point it was found that when urine containing many bacilli was passed on to soil (either in the dark or exposed to light and sun) the bacilli could not be recovered after 30 hours. In faeces passed into dry earth, the bacilli were recoverable from the surface up to the 5th day, and from the centre of the mass till the 14th day. When faeces were smeared on blankets, the bacilli also died rapidly, though this depended on the temperature, in cold weather typhoid being still recovered after one month. On towelling the bacilli in urine were recoverable for 10 days or more. The author considers that in the presence of other organisms, especially *B. coli*, under conditions where these can multiply (as in soil or faecal contamination, in warm weather) typhoid and paratyphoid bacilli die out quickly; but where such conditions are absent (as in urine contamination or at low temperatures) they may survive for a considerable period.

The following observation is of importance in view of the method at present strongly advocated of diagnosis by repeated examination of the serum. "A study of the Widal reactions in over 100 cases" [of paratyphoid A fever] "has shown that in the early days of the fever the agglutinins are not present, but as a rule the group reaction for *B. typhosus* begins before the specific reaction for *B. paratyphosus* A. This group reaction for the *B. typhosus* may reach as high a titre as that obtained in an attack of true enteric fever. The reaction for paratyphoid is, as a rule, lower, and may only be demonstrated in such dilution as 1 : 20 or 1 : 40. . . . . [It] is frequently transient and may only be present for a few days in the later stages of the fever."

Col. Harvey maintains very strongly and justly the military importance of thorough examination of convalescents not only in typhoid but in paratyphoid, and hopes that by systematic procedure the incidence of the latter in India may be reduced as much as typhoid has been. [The paper was written in 1911-1912, and much of what is published here has been justified by recent experience and is of great value at the present time.]

J. Henderson Smith.

**FAICHNIE (N.). The Recent Decline of Enterica amongst British Troops in India.—*Jl. State Med.* 1915. Sept. Vol. 23. No. 9. pp. 262-271; Oct. No. 10. pp. 296-305.**

Enterica, under which name is included paratyphoid fever with typhoid, has been diminishing in the Indian Army since 1908, and while the decline has been steady for India as a whole, in individual stations the manner in which it begins is sometimes striking. Thus in Ambala, the rate which had for 20 years up to 1905 been 30 per cent. suddenly fell to 5 and has remained so; in Mhow with a similar former

rate it fell in 1908 to 4, and has stayed there. It was not till 1909 that inoculation had been carried out on a scale extensive enough to affect general statistics. The decline can hardly be attributed to improved water-supplies, or precautions against milk, dust or the other usually assigned causes of the disease. But the author "is strongly of opinion that the isolation of "carriers" has had very little to do with it." The importance of the carrier amongst the troops in India has, he thinks, been greatly exaggerated, as the carrier fails to explain the salient characters of enterica as it occurs in that country, and should give rise to characteristics which are not in fact met with. Nor does he admit that direct transference by flies can be of fundamental importance. He does, however, incriminate the fly in another way. The fly in this view deposits in human faeces eggs, which in due course hatch out into larvae. These larvae become intestinally infected with the organisms prevalent in the material in which they hatch, and the same contents are met with in the adult fly developed. The faecal bred fly then deposits its excrement or vomit in barracks or other situations whence man can be infected, and thus if the faeces in which the eggs were laid were infected with typhoid, cases are caused of enterica. The experimental finding that typhoid bacilli cannot be recovered from adult flies fed on typhoid material after 24 hours is explained on the assumption that the adult fly has an already established flora, which kills out the intruding typhoid under these conditions, whereas in the faecal bred fly the original flora contains (or may contain) typhoid and will continue to do so. Enterica therefore will be present where opportunity occurs for faecal bred flies to carry their infection. If the trenches where night-soil is buried are (1) far from the barracks, or (2) so constructed or treated that fly-eggs cannot hatch out, then infection should not occur; and Col. Faichnie quotes a number of instances (as at Mhow) where improved trenching was accompanied by an immediate drop in the enteric incidence. He urges as an immediate reform that the shallow 12-inch trench should be forthwith abandoned.

J. H. S.

**SNIJERS (E. P.).** *Over de epidemiologie van de Febris Typholdea, naar aanleiding van waarnemingen in Deli.* [Observations on the Epidemiology of Typhoid in Deli.] [With summary in German.] —*Geneesk. Tijdschr. v. Ned. Ind.* 1915. Vol. 55. No. 4. pp. 393-420.

It is frequently said that in any outbreak of typhoid fever there is a large number of cases which pass unrecognised or are only diagnosed by very thorough examination. But the proportion that such mild cases bear to clinically recognisable cases is a matter of uncertainty, and no doubt varies in different places. Typhoid may be said to be endemic in Deli, the death rate per 10,000 population having been 30 from 1897-1904, and 14 from 1905-1912. There seemed to be a chance of ascertaining here whether mild cases were at all frequent, since it is usual to have the stools, blood and urine examined in any doubtful case of even slight diarrhoea, through fear of cholera, dysentery or typhoid itself. Out of about 1,700 bacteriological examinations in the year 1914, 94 gave a positive finding of typhoid

bacilli; and in all but six of these the disease had been suspected or tentatively diagnosed on clinical grounds. In one of the six there was also a dysentery due to amoebae and in another the predominant symptom was pyelonephritis. In this endemic area, then, there was nothing to suggest that mild or unrecognised cases, or at all events such cases with diarrhoeic symptoms, were at all frequent. The post-mortem examinations during the year agreed with this. Out of 81 autopsies four were due to enteric, and 3 were recognised before death (the fourth being in a Javanese who died before full examination was made). One or two carriers were found, but the distribution of the cases in the district did not suggest that they were largely due to such a cause. The writer gives an historical account of the progress of epidemiological theories of the spread of typhoid. J. H. S.

JENNISSEN (J. A. M. J.). **Een typhusendemie in de Raya-vallei te Billiton.** [An Outbreak of Enteric Fever in the Raya Valley at Billiton.]—*Geneesk. Tijdschr. v. Ned. Ind.* 1915. Vol. 55. No. 1. pp. 10-25. With diagram; No. 5. pp. 487-509. With 12 charts.

An account of an outbreak of enteric amongst a body of 1,500 Chinese coolies employed at the Billiton tin-mines. The cause was traced to the bathing of men in a pool of water contaminated with human excreta. The author points out that as enteric fever is very common in China, typhoid-carriers are always to be expected amongst emigrating Chinese. The account is chiefly interesting for the wholesale vaccination of the body of coolies implicated, with typhoid vaccine supplied by the Pasteur Institute at Weltevreden. The usual result of a great reduction in the severity of the disease amongst the completely vaccinated was observed, 33 cases with one death occurring amongst the vaccinated and 249 with 41 deaths amongst the non-vaccinated [the total number in each class is not stated]. Other hygienic measures of the usual kind, such as the provision of a fresh water supply, were taken in addition, and the supervision of the rainy season with its flushing of the soil finally brought the trouble to an end.

The second portion contains clinical notes on various features of interest in the epidemic, from which it appears that enteric fever runs very much the same course, as regards complications, in a Chinaman as it does in a European. Out of a total of 267 cases of the disease, 107 were selected for treatment with a therapeutic vaccine, prepared according to CHANTEMESSE'S directions at the Pasteur Institute at Weltevreden, but without any apparent advantage. The mortality among these 107 patients amounted to 12, or 11·2 per cent., while among the whole 267 there were 27 deaths, or 10·5 per cent. This decidedly low mortality is attributed by the author, probably quite correctly, to the early detection of the cases, and their immediate removal to hospital.

J. B. Nias.

WINCKEL (Ch.). **Paratyphus A in Nederlandsch-Indië.** [With summary in German.]—*Geneesk. Tijdschr. v. Ned. Ind.* 1915. Vol. 55. No. 1. pp. 35-54.

Out of 48 cases of suspected enteric bacteriologically examined by the author at Batavia during the months of September, October and

November 1914, 10 proved to be paratyphoid A (Brion-Kaijser), 1 *B. coli* and 37 true *B. typhosus*. The author thinks this percentage of paratyphoid unexpectedly large. He puts forward the suggestion that typhoid vaccine for use in the Dutch Indies should always be a mixed vaccine, containing paratyphoid A. Paratyphoid B was not observed.

J. B. N.

**SNIJDERS (E. P.).** **Over de vraag der Typhus-verbreiding door vliegen en stof.** [The Spreading of Enteric by Flies and Dust.] [With summary in German.]—*Geneesk. Tijdschr. v. Ned. Ind.* 1915. Vol. 55. No. 1. pp. 55–63.

A critical discussion of the question indicated by the title, chiefly directed against the views of MESSERSCHMIDT [*Centralblatt für Bakteriologie*, 1 Abt. Orig. 1914, Vol. 74, p. 1]. As might be expected from a writer in a tropical country, the view is taken that flies and dust, along with typhoid-carriers, play quite as prominent a part in the dissemination of typhoid as the contamination of water-supplies.

J. B. N.

**GAIDE.** **Note sur la fréquence de la fièvre typhoïde dans le Nord-Annam.**—*Bull. Soc. Med. Chirurg. Indochine.* 1915. July. Vol. 6. No. 7. pp. 234–238.

In North Annam in the years 1909–1914 22 cases of typhoid with 13 deaths have occurred in Europeans and 79 with 17 deaths in natives, and there were, no doubt, many others which were unrecognised either because of their mild character or because of errors in diagnosis.

J. H. S.

**SCOTT (Harold).** **An Investigation into the Causes of the Prevalence of Enteric Fever in Kingston, Jamaica; with Special Reference to the Question of Unrecognised Carriers.**—*Ann. Trop. Med. & Parasit.* 1915. June 30. Vol. 9. No. 2. pp. 239–284. With 10 charts.

From an analysis of the notifications of disease in Kingston during the last 10 years Scott finds that the average number of enteric notifications per month presents a curve, which, lowest in January and February, rises steadily to a maximum of nearly 35 in June, falls again to under 20 by August, and remains about the same for the rest of the year, with a secondary slight rise in November. In no month is it less than 15, and even when allowance is made for the inaccuracy of notification records this is a large number for a town of 60,000 inhabitants with the natural advantages of climate and situation possessed by Kingston. The water supply is good and regularly tested; but every opportunity is given for the spread of infection by the other recognised routes owing to the absence of a water-carriage system in a large part of the area and the habits of the population. Scott set himself to examine the bile in every autopsy that came under his care with the object of gaining therefrom some idea of the prevalence

of carriers in the general population, and he here gives the result of the examination in 200 cases. Twenty-eight of these presented macroscopic evidence of enteric, although in six the disease had not been diagnosed during life, and from 25, including one paratyphoid A, the organism was isolated from the bile. In six other cases which died from other causes, presented no evidence of enteric post mortem and gave no history of enteric at any time, *B. typhosus* was obtained, and in at least two of these there was no evidence of cholecystitis. It would scarcely be justifiable to conclude from evidence of this sort, or from so small a series of cases, that 3 per cent. of the population were carriers, but it is enough to show that there must be carriers enough to maintain the disease in Kingston under the prevailing sanitary conditions.

J. H. S.

**BAYMA (Theodoro). A Typho-Vaccina em S. Paulo. Segunda nota.** [Anti-Typhoid Inoculation at St. Paulo. Second Note.]—*Ann. Paulistas de Med. e Cirurg.* 1915. Vol. 5. Nos. 2-4. 7 pp.

The second portion only of a paper of which the first does not seem to have come to hand, and which it is consequently not possible to summarise very satisfactorily. In the course of an epidemic of enteric fever at San Paulo, Brazil, about 11,000 persons, of whom a large proportion were public officials or the inmates of public institutions, were vaccinated with anti-typhoid vaccine. As the total population of the city of S. Paulo amounts to 500,000, this number is only  $2\frac{1}{4}$  per cent. of the whole. The result seems to have been satisfactory as regards the occurrence of cases amongst the inhabitants of schools and other similar institutions, but naturally the exposure to infection is usually much less in such places from ordinary sanitary precautions, such as the boiling of water and milk, being taken at the same time. The data furnished are therefore not very instructive. The vaccines used were locally prepared according to four different processes, the method of F. RUSSEL proving the most satisfactory.

J. B. N.

**VON WILUCKI. Bericht über 33 Krankheitsfälle von Paratyphus B an Bord S. M. S. "Posen".** [Report on 33 Cases of Paratyphoid B on Board the "Posen".]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1915. June. Vol. 19. No. 12. pp. 321-336.

A small epidemic occurred on this ship, involving 33 persons. The cases did not occur explosively but irregularly over some time, and presented great variety of symptoms. The water was infected with "paratyphoid-like" bacilli, but genuine Paratyphosus B was isolated from food, and as many as six carriers were found amongst the staff handling food, and also one other in the pantry. A dog was also found to be carrying the bacilli. Large doses of *Bolus alba* were very effective.

J. H. S.

TORRENS (J. A.) & WHITTINGTON (T. H.).—**Preliminary Note on the Clinical Aspects and Diagnosis of Paratyphoid Fever.**—*Brit. Med. J.* 1915. Nov. 13. pp. 697–703. With 12 charts.

Paratyphoid fever in Western Europe is much more commonly due to the B type of bacillus than the A type. In India, however, the A type has been comparatively common, and in the experience of the writers the A cases have been in troops from India for the most part or in men in close association with them. Clinically the two are indistinguishable, but the A fever is apt to last three or four days longer than the 10–18 days typical of B infections, and is in general rather milder. The temperature in both shows a characteristic disinclination to settle down finally. Cases may present the symptoms of the most severe type of typhoid, but are in general mild, and it is with these milder types, which may resemble a slight influenza, chill or rheumatism that this paper chiefly deals. The onset usually occurs in one of two fashions, either a gradually increasing headache and slight abdominal pain with perhaps some diarrhoea, nothing at first to make the victim see a doctor but slowly developing, or a sudden onset such as occurs often in influenza, where the patient goes to bed quite well and awakens feverish with severe headache, abdominal pain, diarrhoea and perhaps shivering. In 100 cases of B. infection and 50 of A, the onset in 85 per cent. included headache, in 55 per cent. diarrhoea, in 35 per cent. abdominal pain, in 30 per cent. pain in the limbs, 25 per cent. shivering, 25 per cent. extreme general weakness, 25 per cent. backache, and 20 per cent. epistaxis. The headache, usually vertical, is the predominant symptom and is voluntarily mentioned by 80 per cent. of the patients. The initial diarrhoea is slight and gives place in a week to constipation, and the early repeated shivering is very noticeable, especially in A infections. Epistaxis is rarely marked. Cough, vomiting, dizziness are often seen. The temperature may rise to its maximum in 48 hours, but the writers did not see very many early cases.

By the second or third week the symptoms in the average case are of this character.—The aspect is dull, the patient is rousable but heavy and lethargic, headache and backache are complained of. The temperature varies from 99·2° to 102·4°, producing a characteristic spiky chart. It is not common (5 per cent.) to have a continuous high fever; 104° was reached in only 12 per cent. The pulse is slow, even more than in typhoid, and variable in its slowness in the same patient; it is soft and compressible. About 15 per cent. of cases show dicrotism, and when present it is almost pathognomonic of an enteric group infection. Spots occur in 75 per cent. of cases at one time or another, and in 20 per cent. are present after the temperature has reached normal. They are larger, more regular and of a deeper red than in typhoid, and usually fairly definite. In A cases the rash tends to be very profuse. The spleen is enlarged and palpable in nearly 60 per cent. of cases, and should always be examined, as it is palpable even in quite mild cases and is readily made out because the abdomen is commonly not distended.

In the third week improvement sets in, and is obvious even though the temperature is still high. Defervescence is usually by modified crisis or short lysis. But the pulse is then the best guide to the

condition of the patient. If it is over 100, it is a bad sign. The complications seen in typhoid may all occur; meteorism and bronchopneumonia are not so frequent, but haemorrhage is as frequent as in typhoid. Paratyphoid B appears to affect particularly the large gut (caecum, descending colon) and to be very liable to induce pus formation.

Short relapses or returns of fever are fairly common, especially in paratyphoid A (25 per cent.) where they may be associated with rigors. The mortality was a little over 4 per cent. in B infections, and a little under 1 per cent. in A infections.

J. H. S.

SAFFORD (A. H.). **Paratyphoid "A" Fever.**—*Brit. Med. Jl.* 1915. Nov. 13. pp. 713-714. With 2 charts.

A short clinical statement based on 100 cases, agreeing in the main with the preceding account of TORRENS and WHITTINGTON.

J. H. S.

ROBINSON (Henry). **Notes on the Clinical Characteristics of Cases treated as Paratyphoid Fever.**—*Lancet.* 1915. Oct. 16. pp. 851-860. With 12 charts.

A clinical study based on 47 cases where paratyphoid organisms were definitely isolated, and a number of others, in which though clinically the diagnosis was almost certain, the organism was not in fact obtained. Stress is laid on the slow, occasionally very slow, pulse, and on the characters and prominence of the roseola.

J. H. S.

MINET (Jean). **Complications de paratyphoidiques (1<sup>re</sup> note.) Hemorrhagies intestinales.**—*Bull. et Mém. Sec. Méd. de Hôpit. de Paris.* 1915. Oct. 21. Vol. 31. 3 ser. No. 29-30. pp. 838-845. With 3 charts.

In 60 cases the author saw three severe haemorrhages, one in an A infection recurring over a period of five days, and two in B infections. None was fatal, though the loss of blood was considerable in all, and only in one was the haemorrhage accompanied by a fall in temperature.

J. H. S.

COYON (Am.) & RIVET (Lucien). **Etude clinique sur les paratyphoides.**—*Bull. et Mém. Soc. Méd. des Hôpit. de Paris.* 1915. Oct. 21. Vol. 31. 3 ser. Nos. 29-30. pp. 773-785. With 4 charts.

In 96 blood cultures made from suspected cases of enteric the *B. typhosus* was obtained three times, *B. paratyphosus* A 41 times, and *B. paratyphosus* B 10 times. Forty-two cases gave no result on culture, but of these 16 were determined serologically to be infections with A (7 times) and B (9 times). In many of the positive cases the Widal reaction was negative for all three organisms at the time of bleeding, and in others it was negative for both paratyphoids and positive for



typhoid, possibly owing to inoculation. In such cases a later examination often showed an intense positive reaction for one or other organism, and there seemed ground for believing that the agglutination reaction appeared late in paratyphoid infections, later than in typhoid, e.g. in one case Widal reaction was negative on the 18th day for all three, but strongly positive for paratyphoid A on the 23rd day. [This is a common experience.] In 24 cases in which blood culture was positive no agglutination was obtained. [But no indication is given as to when the serum was tested.] Clinically the authors saw only three cases of abrupt onset, and no instance of the true typhoid state. The only unusual feature in their clinical description is the intense sweating they observed in almost all their cases, the patients being bathed in perspiration continually. They had seven relapses, all in A infections.

J. H. S.

**COYON (Am.) & RIVET (Lucien). Un cas mortel de paratyphoïde B. Péritonite à bacilles paratyphiques et colite ulcéreuse segmentaire.**

—*Bull. et Mém. Soc. Méd. des Hôpit. de Paris.* 1915. Oct. Vol. 31. 3 ser. Nos. 29-30. pp. 786-790. With 1 chart.

There was no perforation, though the bacillus was recovered from the peritoneal fluid, but intense ulceration of the Peyer's patches of the lower end of the small intestine and in particular large lesions in the appendix and caecum and, most of all, in the descending colon where there was extensive ulcerative colitis. [Similar involvement of the large intestine has been described by various writers on paratyphoid cases.]

J. H. S.

**IRONS (Ernest) & JORDAN (Edwin O.). An Infection with the Paratyphoid Bacillus (*B. paratyphosus* B).—*Jl. Infect. Dis.* 1915. July.**

Vol. 17. No. 1. pp. 234-240.

In this case an attack of fever, due to paratyphoid B and accompanied by gall-bladder symptoms, left the patient a chronic carrier for over a year with intermittent recurrence of cholecystitis during that time. The gall-bladder was then drained, and the attacks have not recurred for over a year, and during that time no paratyphoid bacilli have been found in the stools, though present in pure culture at the time of operation. A point of special interest is that the patient had three attacks of pain in the region of the gall-bladder in the five weeks before the general infection developed. During the acute attack the organism was isolated from the blood, but it could not be definitely ascertained whether the original cholecystitis was an early manifestation of an infection which later became general, or whether a paratyphoid infection supervened in a patient already suffering from a recurrent cholecystitis. No gall-stones were found at the operation.

J. H. S.

**SCHMIDT (P.). Ein Fall von intrauteriner Uebertragung von Paratyphus.**

[A Case of Intrauterine Transmission of Paratyphoid B].—*Deut. Med. Woch.* 1915. July 29. Vol. 41. No. 31. pp. 911-912.

Cases of intrauterine infection of the foetus with typhoid have been repeatedly put on record, but this appears to be the first report of a

similar occurrence with *B. paratyphosus* B. The bacilli were isolated from the blood and stools of the mother, and the child was born the day after the blood was drawn. The day after birth blood was taken from the child by scarifying the back and found to contain the organism, though the stools were negative. Blood was again drawn, special attention being given to sterilising the skin, and again found positive, and a skin culture made at the same time (to exclude possible surface contamination) was negative. The child died on the fourth day, without fever and without agglutinins in the blood, and a bilateral pneumonic infiltration with enlarged spleen was found post mortem, *B. paratyphosus* being again isolated from heart, bile, urine and spleen. The invasion was too general at the time of first examination to make infection from the maternal passages at birth a probable explanation, and a transplacental infection seems to have occurred.

J. H. S.

REITER (Hans). **Ueber therapeutische Typhusvakzination.** [Treatment of Typhoid by Vaccines.]—*Deut. Med. Woch.* 1915. Sept. 16. Vol. 41. No. 38. pp. 1120–1123.

The author gave at 3–5 day intervals repeated subcutaneous doses of ordinary prophylactic vaccine [presumably heat-killed] in 67 cases of typhoid fever, and reports favourably on the results, especially on a reduced duration and diminished mortality. But complications are in no way affected, and it is not treatment which invariably produces improvement.

J. H. S.

DEUTSCH (Felix). **Zur Vakzinebehandlung des Typhus abdominalis.** [Treatment of Typhoid by Vaccines.]—*Wien. Klin. Woch.* 1915. July 29. Vol. 28. No. 30. pp. 810–812. With 6 curves.

An unstated number of cases was treated with Besredka vaccine and, unlike the majority of writers on this subject, the author is very sceptical as to any real advantage gained by it. Intravenously he regards it as dangerous, owing to the risk of heart failure, if repeated injections are given (he used a dose of 0.25 to 1 cc.), and after trying intravenous followed by subcutaneous injections, he finally adopted the subcutaneous route (1–4 cc.) for all injections; this was always well borne without marked reaction. In one case after a typical reaction and continued fall of temperature, the patient went down hill steadily and died on the 5th day. Good results were certainly obtained in some cases, but there were very many failures.

J. H. S.

PAULIOEK (Emanuel). **Zur Frage der Typhusheilmpfungen.** [Treatment of Typhoid by Vaccines.]—*Wien. Klin. Woch.* 1915. July 15. Vol. 28. No. 28. pp. 759–763. With 13 charts.

Sixty-eight cases treated intravenously with Vincent's vaccine, 100 millions; the usual effects of rigor and fall of temperature by crisis or rapid lysis. Two deaths from intestinal haemorrhage followed on the injections, and 21 other deaths occurred chiefly from complications. In 37 cases success was immediate, in 18 the temperature took 2–3 days to come down; 8 were quite refractory.

J. H. S.

REIBMAYR (Hans). **Ueber Impfstoffbehandlung des Typhus abdominalis auf intravenösem Wege.** [Intravenous Vaccine Treatment of Typhoid.]—*München. Med. Woch.* 1915. May 4. Vol. 62. No. 18. pp. 610-612. With 11 Curves.

In 68 enteric cases intravenous injections were made of 0.5-1.2 cc. of an emulsion containing 500 million typhoid bacilli, killed by 1 hour at 53° and suspended in 0.5 per cent. carbolic. In normal individuals this may produce a rise of temperature to about 40°. In typhoid cases there developed a shivering fit in about a half to three-quarters of an hour, which lasted perhaps half an hour and might be accompanied by fluid evacuations, and the temperature rose to 40°, 41° or even 42°. After 5-24 hours the temperature fell rapidly to 37° or even to 35°. The rigor was not accompanied by any increase in the number of bacilli in the blood, and no change in the leucopenia or leucocyte picture developed during it or during the rise of temperature, and the agglutination titre remained steady. It might be to some extent limited in severity by administering a gram of quinine an hour before giving the injection. The improvement in the condition of the patient was undoubted and not confined to the temperature. Even in those cases where the temperature rose again, there was a decided improvement otherwise. Some cases did not react and the writer thinks that those cases which do not respond to a first injection will not do so to any further injections. Of the 68 cases 41 were definitely improved, of whom 14 lost their fever entirely. The remainder did not respond at all.

J. H. S.

LOEWY (Robert), LUCKSCH (Franz) & WILHELM (Ernst). **Zur Vakzine-therapie des Typhus abdominalis.** [Vaccine Treatment of Typhoid.]—*Wien. Klin. Woch.* 1915. July 15. Vol. 28. No. 28. pp. 756-759. With 2 curves.

Eighty-two cases were treated with Vincent's vaccine (49 subcutaneously, 26 intravenously and 7 in both ways), and 95 with Besredka's vaccine (49 subcutaneously, 21 intravenously and 15 both ways); and the conclusion reached is that the method is a good one. Subcutaneous injection was quite harmless and fairly efficient in reducing temperature, but intravenous was quicker and better, though any cardiac complication is to be held as a complete bar. The dose intravenously should not exceed 125 millions; subcutaneously a first dose of 250 millions can be given, rising to 500 or even 1,000 millions. Besredka's vaccine was found better, and it usually produced a leucocytosis.

J. H. S.

BRACH (Cel.) & FROELICH (Jos.). **Zur Vakzinebehandlung des Typhus abdominalis.** [Vaccine Treatment of Typhoid.]—*Wien. Klin. Woch.* 1915. June 10. Vol. 28. No. 23. pp. 615-616. With 4 charts.

Sixty cases treated with 500 millions of Vincent vaccine subcutaneously, and later increasing doses if required, on alternate days. There were five deaths from heart failure (possibly accentuated

by the treatment) and in 15 no successful result. In 15 the temperature came down within three days, and stayed down, and in 25 more it was down inside five days. No complications were observed in these cases.

J. H. S.

SZÉCSY (Eugen). **Die Behandlung des Typhus abdominalis mit Besredka's Vakzine.** [Treatment of Typhoid with Besredka's Vaccine.]—*Deut. Med. Woch.* 1915. Aug. 12. Vol. 41. No. 33. pp. 966-968.

The cases coming under Szecsy's care had all been recently in the trenches, were ill-nourished, many of them wounded, and 11 per cent. with frostbite severe enough to require amputation, and before vaccine was tried he had a mortality of 22 per cent. When he adopted vaccine the mortality fell to 2 per cent., although he made no selection among the cases treated. After trying smaller doses he came to the conclusion that the best results were got with a vaccine not more than 12 days old and containing a half-loop of sensitised bacilli (Besredka) in each 1 cc. Of this he gave 1 cc., 2 c.cc., 3 cc., and 4 cc. on successive days, a total of 5 loops in 4 days. With this he had 25 per cent. relapses, which yielded at once either critically or in a 1-2 day lysis to a further 4 cc. dose. The duration of the disease was brought down to 8-10 days and the injection caused no local or general unpleasantness. So marked is the effect of the vaccine on relapses that it could be used diagnostically on a rising temperature in convalescent typhoid cases, failure to affect the temperature indicating a complication and not a relapse.

J. H. S.

DUBARRY (J. P.). **Document sur la vaccination antityphoïdique par la voie gastro-intestinale.**—*C. R. Acad. Sci.* 1915. May 25. Vol. 160. No. 21. pp. 690-692.

Amongst the prisoners of war at Toulouse there was a series of cases of typhoid in the different cantonments, and vaccination was ultimately carried out. In many cases the prisoners were in a state so feeble that the usual method seemed inadvisable, and in 373 vaccine was administered in pill form by the mouth. The results were, so far as could be gathered from the subsequent reports, very satisfactory.

J. H. S.

JACOB (P.). **Die Neosalvarsantherapie beim Typhus abdominalis.** [Treatment of Typhoid by Neosalvarsan.]—*München. Med. Woch.* 1915. June 15. Vol. 62. No. 24. pp. 808-811. With 3 charts.

In 25 cases neosalvarsan was injected intravenously in dose of 0.15 or; more often, 0.3; no ill effects of any kind were observed. Four of these cases turned out eventually not to be typhoid, but the remainder were all of severe or moderately severe enteric, mostly in the second or third week. "In consequence of months of previous military operations they were all in a high degree of exhaustion and presented, if no other worse complication, always an extensive bronchitis." On the complications, such as bronchitis, pneumonia, etc.,

the treatment had no direct effect, nor, it is said, did it affect paratyphoid infections. But on the enteric the effect was pronouncedly beneficial. In patients in the worst form of the "typhoid" state the change in 24-48 hours was most striking, all symptoms of intoxication disappearing and not returning. The temperature usually fell, though the existing complications might keep it high in some cases; but the author lays most stress on the good influence on the general condition and this indirectly affected the complicating conditions favourably. There were no rigors or sweats, no haemorrhages, and he had no relapses in his series.

J. H. S.

**JOB. Quelques remarques sur la valeur de la constation du Bacille Paratyphique B. dans le sang.**—*Bull. et Mém. Soc. Méd. des Hôpit. de Paris.* 1915. Oct. 21. Vol. 31. 3 ser. No. 29-30. pp. 790-793. With 3 charts.

The writer has isolated paratyphoid B three times from the blood in cases where there were at least other infections as well, and he suggests that this organism may have been merely a temporary and inoffensive invader. Two of these were cases where malaria parasites were found in the blood, and the symptoms yielded to quinine in a short time. The third was a case where a severe bacillary dysentery had been successfully treated with serum and the patient was convalescent, when a sudden pain in the side and a rise of temperature to 40° led to blood culture and the recovery of paratyphoid B. A lobar pneumonia with pneumococci in the sputum then developed. [The symptoms in both the malaria cases are, as described, those of a concomitant paratyphoid infection, and the last had had a bacillary dysentery—of which the type is not described. This is hardly enough ground for saying that the organism was in these cases a "banal saprophyte"; and one would wish details of the organism before accepting such a view.]

J. H. S.

**GOLDSCHIEDER. Impf-Milzschwellung und Typhusdiagnose.** [Enlargement of Spleen after Vaccination and the Diagnosis of Typhoid.]—*Deut. Med. Woch.* 1915. Sept. 30. Vol. 41. No. 40. pp. 1177-1179.

After a complete typhoid inoculation the spleen is enlarged in many persons, and may come two finger-breadths below the rib margin in pronounced cases. It gradually returns to normal, but the time varies in different individuals, and out of 184 soldiers, two months after their last injection it was still palpable in 11, or 6 per cent. In 121 men four months after inoculation the spleen was still palpable in no instance. In any case of suspected typhoid the significance of splenic enlargement is therefore considerably affected by the time of previous inoculation.

J. H. S.

**SCRIBA. Ueber den Einfluss der Typhusschutzimpfung auf den Nachweis der Typhusbazillen im kreisenden Blut.** [The Influence of Vaccination on the Demonstration of Typhoid Bacilli in the Blood.]—*München. Med. Woch.* 1915. June 1. Vol. 62. No. 22. pp. 764-765.

In the institution where Scriba worked, HOHLWEG had previously obtained 23 positive blood cultures by precisely the same method as

Scriba used, but the latter could obtain only one positive out of about half as many cases as HÖHLWEG had tried. He attributes this to the effect of inoculation in his cases, and he connects with the same fact the diminished frequency of roseolae, the absence of brain symptoms, and the generally lower temperature. Half his cases did not rise above 38°, and from these he made no blood cultures. [But the bacillus can occur in the blood without any high temperature.] He is convinced that the disease takes a milder course in the inoculated.

J. H. S.

GAY (Frederick P.). **Typhusimmunisierung.** [Typhoid Immunisation.] —*Ergebnisse der Immunitätsforschung, Experimentellen Therapie, Bakteriologie und Hygiene.* 1914. Vol. 1. pp. 231-256.

In this review of present knowledge on the subject Gay deals chiefly with the results obtained in animal experiments, which he in collaboration with others has published at various times in recent years. He gives an excellent summary of previous work, in which he fully recognises the importance of the experiments carried out by METCHNIKOFF on anthropoid apes. These animals however are too expensive for most workers, and he has developed a technique of experiments in rabbits, which he thinks gives an approximation to the conditions obtaining in man and allows the value of any immunising process to be estimated in a manner which is more satisfactory than the mere administration of a number of lethal doses, or any *in vitro* estimation of the antibody production by the treated animals. With a certain culture of *B. typhosus* in a standard dose he is able to produce in all rabbits which survive the injection for more than a day or two, a carrier state in which the bacilli commonly remain demonstrable in the blood or at all events remain alive in the gall-bladder. In previously well immunised animals, however, this carrier state does not develop; and he is able to estimate the value of any immunising procedure by ascertaining whether it has been powerful enough to prevent the development of the carrier state on the administration of his test dose. He has further prepared a vaccine, consisting essentially of the dried and ground bacilli precipitated by alcohol from suspension after they have been sensitised by immune serum. This he finds by his rabbit test to be at least as good a vaccinating agent as any already in use (including living sensitised bacteria, as used by BESREDKA), and better than most. This preparation he has employed in man on a large scale, injecting three doses at short intervals (the process being over in a week), and the reactions have been remarkably slight. As to what degree immunity is established in men, data are not yet fully available. It is not absolute, and Gay hopes to improve still more on the preparation; but he has devised a skin reaction analogous to the von Pirquet tuberculin reaction, which gives some indication of the state of the individual's immunity. [It is impossible here to refer to many points of interest discussed in this article, which brings together much of the large experience on this subject of Professor Gay.]

J. H. S.

**SAWYER (Wilbur A.). The Efficiency of Various Anti-Typhoid Vaccines.**—*Jl. Amer. Med. Asscc.* 1915. Oct. 23. Vol. 65. No. 17. pp. 1413-1417.

It is sometimes maintained that the evidence in favour of antityphoid inoculation, being largely based on military experience and more particularly on that experience in time of peace, is hardly applicable to civilian conditions where the hygienic circumstances may be much worse and the exposure to mass infection by water, milk or contact is often higher. It would certainly be valuable to have reliable information in regard to the degree of infection conferred against exposure to really heavy infection, but this can hardly be obtained from civil statistics. Inoculation is rarely carried out in communities on any extensive scale till an epidemic breaks out, and then other measures are taken; and if inoculation has been previously done before the attack, much of it is apt to be old and no longer to be regarded as satisfactory. The State Board of Health and University of California have recently attempted to get some information as to the incidence of typhoid amongst inoculated civilians, and circularised 2,400 physicians in the State with enquiries. The replies covered a total of 8,124 vaccinated, and amongst these 5 per 1,000 of subsequent infections (with 0.49 per 1,000 deaths) occurred in the period from 30 days to 2½ years after the injections. Of these nearly 5,000 received the Gay-Claypole vaccine (with 4.3 per 1,000 later infections), and 2,000 received one brand of trade vaccine (with 7.4 per 1,000 infections). This rate is high, higher than the general rate for the whole of California State, but there is no guarantee available that the vaccination was efficiently performed, or that the diagnosis of subsequent infections was always correct, and naturally the vaccines were most used just in those places where the risk of infection was greatest, and no evidence is given—probably none was available—of the incidence in the uninoculated in the corresponding districts. The unusual exposure is shown by the fact that 824 of the vaccinated were nurses, mostly nursing typhoid cases, 608 were members of households where enteric cases existed, 953 were in the midst of existing epidemics. The conclusion is reached that if widespread and severe exposure is prevented by general hygienic measures, vaccines can be relied on to reduce greatly the residual typhoid fever “especially if a large enough number of people are vaccinated to reduce contact infection to a minimum.” The Gay-Claypole vaccine appeared to be rather more efficient, but the nature of the vaccinated population was such as to leave this unproved; and there was little to choose between any of the 11 preparations of vaccine used as regards severity of reaction.

J. H. S.

**PERCELLI-TITONE. Ricerche sul potere agglutinante del siero dopo il trattamento col tetravaccino Castellani, tifo + paratifo A + paratifo B + colera.** [The Agglutinating Power of the Serum after Inoculation with Tetravalent Vaccine.]—*Riforma Med.* 1915. June 12. Vol. 31. No. 24. pp. 648-649.

Two rabbits were injected at eight day intervals with 0.5 cc. of CASTELLANI'S vaccine containing four organisms. On the eighth day

after the second injection, the agglutination titre of the serum was in the first animal 1,200 against typhoid, 1,000 against paratyphoid A, 600 against paratyphoid B, and 350 against cholera. In the second animal the titre was 600, 1,200, 1,200 and 600 against the same organisms. Another experiment was made on a man, who was given 0.5 cc. as a first and 1 cc. as the second injection, and 0.5 cc. as the third. Eight days after the second injection the titre of his serum was 500, 500, 600 and 60; and by the second day after the third injection it had risen to 600, 500, 1,000 and 100. This is comparable to the values obtained when the organisms are given separately. [The tests are presumably made microscopically, though this is not stated.]

J. H. S.

REISS (Emil). **Der Wert der Agglutinationsprobe bei Typhus-gelmpften.** [The Value of the Agglutination Test in Vaccinated Persons.]—*München. Med. Woch.* 1915. Sept. 21. Vol. 62. No. 38. pp. 1277-1279.

The ordinary Widal reaction being unreliable in inoculated persons, various attempts have been made to determine a limiting dilution of the serum (e.g. 1 in 400) which might be considered as the effect of inoculation, agglutination with greater dilution being held to indicate an active infection. Reiss points out that all such limits are quite unsafe owing to the individual variation in the extent and duration of the reaction after inoculation. He would even consider a negative reaction to be of little value in excluding typhoid in such cases, and quotes an instance where a previously high titre fell to zero on the onset of an attack of the disease. Infection by another organism, moreover, may cause the pre-existing typhoid titre to rise or fall (as has been found to occur, e.g. in dysentery), and therefore the assumption that a variation of the typhoid titre in the previously inoculated indicates an infection with *B. typhosus* may lead to serious errors in diagnosis.

J. H. S.

CONTE (Giuseppe G.), SESTINI (L.) & TROCELLO (Enrico).—**Sulle reazioni cliniche e sierologiche per vari tipi di vaccino antitifico e antiparatifico.** [Clinical and Serological Reactions in Various Types of Anti-Typhoid and Anti-Paratyphoid Vaccines.]—*Ann. di Med. Nav. e Colon.* 1915. July-Aug. Ann. 21. Vol. 2. No. 1-2. pp. 23-49.

This is a record of a series of tests carried out by the Italian Naval Medical Service with eight different antityphoid vaccines, to ascertain the amount of the reactions produced by the injections and the agglutinin production in the sera of the inoculated. In some instances the development of bacteriotropins was also investigated. Six of the vaccines were prepared in Italy and two by other makers, and it is sufficient to say that those issued by WRIGHT and KOLLE were found in no way inferior and in some respects superior to the others. Details are also given of ten men inoculated with a trivalent vaccine against *B. typhosus* and *B. paratyphosus* A and B, prepared exactly in the manner and doses recommended by CASTELLANI. This was found to produce no more severe reaction than the other monovalent vaccines.



The sera against typhoid gave titres of 1,280–1,600 (perhaps higher in some cases), against paratyphoid A of 320–640, and against paratyphoid B of 320–640 (though not so strongly or so regularly in the last case, and sometimes not till three injections had been given).

J. H. S.

**GAEHTGENS (W.). Die Gruber-Widalsche Reaktion und die Beschränkung ihrer praktischen Verwertbarkeit für die Typhusdiagnose.** [The Gruber-Widal Reaction and the Limits of its Practical Utility in the Diagnosis of Typhoid.]—*München. Med. Woch.* 1915. June 29. Vol. 62. No. 26. pp. 878–880.

The writer had occasion to examine the blood of 273 persons who had been exposed to infection in an epidemic of mild diarrhoea suggesting a dysentery, and he tested the sera against the bacilli of Shiga, Flexner, Y, typhoid, paratyphoid B, and Gaertner. The result of this was to indicate that the epidemic had been due to *B. dysenteriae* Y; but there was a very marked group reaction as well. Of 56 sera which agglutinated Y in 1 in 320, 19 agglutinated Flexner in 1 in 320, and 23 in 160; 7 did Shiga in 1 in 80, and one in 1 in 160; 17 did typhoid in 1 in 80, 7 in 1 in 160, and 6 in 320; 7 did paratyphoid B in 1 in 80, 1 in 160 and 1 in 320; and 7 did Gaertner in 1 in 80, 3 in 160 and 1 in 320. The patients had not been inoculated against typhoid, and there was no reason to think there was any other cause than group-agglutination to account for the results; but they indicate how much care is necessary in establishing a diagnosis by agglutination alone. Except in some instances with Flexner the group agglutination did not reach so high titres as those for Y.

J. H. S.

**CARBONELL (M. V.). Ueber eine neue Methode des Nachweises des Typhusbazillus im Wasser.** [A New Method of Demonstration of the Typhoid Bacillus in Water.]—*Wien. Klin. Woch.* 1915. Sept. 16. Vol. 28. No. 37. pp. 997–998. With 1 text fig.

Into a tube of 18 cm. length and 3.5 cm. diameter is placed a second tube of 14 cm. and 2 cm., the latter open at both ends and narrowing and recurved at the lower end. In the lower end of the open tube is packed fine sterilised washed sand to a depth of 4 cm., the outer tube is plugged and the whole sterilised. For use the outer tube is filled with 1 per cent. glucose broth, tinged with neutral red, and when the sand has got moist, the inner tube is filled with a bile culture made from the precipitate obtained from the water under examination by Muller's method (Liq. ferri oxychlorat.). This precipitate is treated with bile in the manner recommended by DITHORN and GILDEMEISTER, and the bile added to the inner tube and the whole incubated for 15–24 hours. In a litre of water to which 1/100 millionth of a loop of typhoid was added, he isolated the bacillus from the glucose broth, whether *B. coli* was present in the water or not; and he states that he has succeeded in isolating typhoid from drinking water in this way.

J. H. S.

SCHMITZ (K. E. F.). **Ein neuer Elektivnährboden für Typhusbacillen.** [A New Differential Nutrient Medium for Typhoid.]—*Cent. f. Bakt.* 1. Abt. Orig. 1915. June 28. Vol. 76. No. 4. pp. 306–319.

After allowing ox-blood to clot the serum is poured off and to the weighed clot twice as much water is added, and this is boiled. After filtering, the usual ingredients, such as peptone are added, and 3 per cent. agar. When the latter is dissolved, 20 per cent. of the original serum is added and the whole sterilised once. The Conradi-Drigalski or Congo-red indicator may be added. On such a medium the author obtained surprisingly good results with mixtures of typhoid and colon bacilli, many colonies of typhoid growing on the Congo-red serum medium from a mixture which contained 10 million *Coli* to every 1 typhoid bacillus. If 0.6 per cent. caffen is added, the *Coli* were almost entirely inhibited, but the typhoid still came up. J. H. S.

BURNET (Et.) & WEISSENBAUGH (R. J.). **Valeur des renseignements fournis par la culture en gélose à l'acétate de plomb, pour la différenciation des bacilles typhique, paratyphique A et paratyphique B. Comparaison avec les résultats obtenus par l'agglutination, dans l'identification de 517 échantillons de bacilles typhiques et paratyphiques.**—*C. R. Soc. Biol.* 1915. Nov. 19. Vol. 78. No. 17. pp. 565–568.

The writers, while recognising that agglutination is the best and conclusive test of differentiation, state that in 20 strains of *B. typhosus*, 393 of *B. paratyphosus* A and 104 of *B. paratyphosus* B., isolated during the present war, the diagnosis obtained by the use of lead acetate medium and neutral red glucose agar (with or without broth to which lactose and and carbonate are added) agreed invariably with the agglutination test. The acetate medium is made by taking a fresh sterile solution of neutral lead acetate, dissolved 1 in 10 in distilled water, and adding 1–20th cc. of this to 4 cc. of melted agar. The tube is inoculated when cooled down by inserting the platinum loop between the wall of the tube and the medium. Paratyphoid B turns black along the needle track in 18 hours; in typhoid the black does not appear so early (24 hours); paratyphoid A does not produce a black line at all or not for some days. [One might feel more confidence in the results recorded if the writers had not said “an organism which ferments glucose and does not produce gas on the lactose broth is a paratyphoid,” a statement amazingly far from being correct.]

J. H. S.

LATHAM (Oliver). **An Expeditious Bedside Modification of the Widal Test.**—*Med. Jl. Australia.* 1915. Aug. 7. Vol. 2. 2nd Year. No. 6. pp. 121–122.

This is a modification of the Bass-Watkin method, using serum instead of whole blood. One volume of serum is mixed on a slide with three volumes of water (tap or distilled) and four volumes of a typhoid bacillus emulsion containing 10,000 millions per 1 cc.; the whole is mixed well, and the slide tilted from side to side and end to end. In two minutes clumping is visible to the eye, if the serum is positive. The emulsion can be kept in bulk with 1 per cent. formalin added, and remains good for six months or more. The author states that he finds it as good as the usual Widal method.

J. H. S.

## PELLAGRA.

SANDWITH (F. M.). **Presidential Address on Pellagra considered from the Point of View of a Disease of Insufficient Nutrition.**—Delivered before the Society of Tropical Medicine and Hygiene on Oct. 15th, 1915.—*Lancet*. 1915. Oct. 23. pp. 905-909.

Dr. Sandwith commences by outlining four prominent theories of the causation of pellagra which are under consideration to-day :—

(1) That the disease is in some way associated with maize.

(2) That pellagra is a protozoal disease probably transmitted by a Simulium or some other insect. He writes that up to the present there is no more evidence that pellagra is insect-borne than the rewas when Dr. SAMBON first suggested the theory in 1905.

(3) The theory of Professor ALESSANDRINI, which has been provisionally accepted by the Pellagra Commission of the Province of Rome in preference to the two preceding. This worker writes that pellagra is induced by "chronic poisoning brought about by the silica in colloidal solution in waters of determined composition." Human pellagra, in his view, is an acidosis and can be cured or greatly improved by the administration of citrate of sodium. Dr. Sandwith points out that the Nile water solids, analysed in October, show 1.33 grains of silica out of the total solids of 8.59 grains per gallon. Moreover, all the drinking water comes from the Nile and not from clayey districts.

(4) TIZZONI's streptobacillus, which has not been found by other microscopists.

He proceeds to recount the evolution of his own ideas regarding this disease since 1890, when he became teacher of clinical medicine at the Kasr-el-Ainy hospital at Cairo. He then found that "pellagra in Egypt was confined to the poorest Egyptians, mostly agricultural labourers, with a decided sprinkling of lunatics." In 1895 he visited Italy, where the disease was apparently confined to the poorest peasants gathered into retreats and to lunatics, and the ordinary private or hospital physician seldom came across it. He was then converted to the belief that pellagra was due to deteriorated maize. In 1907 he became convinced that beriberi was in some way caused by a one-sided rice diet and it then occurred to him that pellagra might be due to some deficiency of nutrition connected with the maize diet, that, in fact, pellagra might be caused "not by what a man eats, but by what he fails to eat."

He then indicates several points of resemblance between beriberi and pellagra and among them that both diseases in endemic countries affect the labouring classes. He gives a list of the diseases due to some specific diet deficiency and suggests that the time has come when pellagra may be provisionally included. He writes :—

"It cannot too often be repeated that all early sane cases of pellagra can be cured, or apparently cured, by removal of patients from their homes to an institution where they are fed on a liberal diet containing meat, and where, for precaution's sake, all maize is excluded from the diet. There is no exception to this rule, excepting some rare fulminating cases which die in a few weeks. Rest and improved diet seem to be responsible for the change, not the removal of the patient from his home. If necessary,

this point could be easily settled, say, in America, by removing 100 patients to an institution and treating another 100 patients in their homes with obligatory rest and a similar improved diet."

He then turns to American experience and gives an account of the views of GOLDBERGER, WARING and WILLETS [this *Bulletin*, Vol. 5, pp. 55 and 67]. These authors concluded that pellagra is essentially of dietary origin, the fault being that the animal or leguminous protein component was disproportionately small and the non-leguminous vegetable component disproportionately large. They pointed out that soldiers and sailors in the public services never suffer from pellagra unless they had it before entering, and that no nurse or attendant in a hospital, pellagra asylum, or lunatic asylum in any country has so far been known to contract the disease. These facts, Sandwith thinks, are in themselves a strong argument against the communicability of pellagra. He refers also to the work of GRIMM [this *Bulletin*, Vol. 1, p. 686] and criticises the so-called feeding experiments at the Peoria State Hospital. He gives an illustration of the association of pellagra and ankylostomiasis. In 1914 he had the opportunity of examining 300 male patients under treatment for ankylostomiasis at the C.M.S. Hospital in old Cairo. Of the 300, 138 and probably a larger number were suffering from pellagra, that is, 46 per cent. He suggests that symptoms due to deficiency of nutrition may occur more early in an anaemic person than in a healthy one.

With regard to maize, it is necessary to find out "whether good maize or bad maize alone can keep a human being in health and what are the essentials absolutely necessary as an added diet to keep a healthy man at work." With a view to throwing light on these problems he and Dr. H. MacLEAN have experimented on guinea-pigs. A quantity of spoilt maize was obtained from Lower Egypt. The experiments are detailed; 75 guinea-pigs in all were used. It is concluded that "bad" maize does not produce any deleterious results in short periods of a month to six weeks, which "throws out of court all the short experiments so prevalent in the literature about pellagra."

A. G. B.

**GOLDBERGER (Joseph) & WHEELER (G. A.). Experimental Pellagra in the Human Subject brought about by a Restricted Diet.—U.S. Public Health Rep. 1915. Nov. 12. Vol. 30. No. 46. pp. 3336-3339.**

A most interesting account "of an experiment planned to test the possibility of producing pellagra in the healthy human, white, adult male, by a restricted, one-sided, mainly carbohydrate (cereal) diet."

The experiment was carried out on convicts, who voluntarily subjected themselves to the necessary restrictions of diet on condition that the experiment should be followed by a free pardon. A squad of twelve men was chosen and kept under careful observation for over two months; during this time, in which the possibility of any pre-existing pellagra was excluded, the men lived on ordinary diet and became accustomed to the routine of labour and discipline which was to continue during the course of the experiment. The experimental

diet was then introduced. The nature of this diet, which did not materially vary from day to day, is sufficiently indicated by the following sample menu for one day :—

“ Breakfast.—Biscuits, fried mush, grits and brown gravy, syrup, coffee with sugar.

“ Dinner.—Corn bread, cabbage, sweet potatoes, grits, syrup.

“ Supper.—Fried mush, biscuits, rice, gravy, cane syrup, coffee, sugar.”

After a few months, one of the twelve volunteers developed prostatitis and had to be released. The remaining eleven were fed on the special diet from April 19th, 1915 to October 31st, 1915. They performed the same work and lived under the same general conditions as twenty other convicts whose food consisted of the ordinary prison fare ; these acted as a control. Special precautions were taken to prevent any tampering with the experiment. The results were as follows :—

“ Of the 11 volunteers, not less than six developed symptoms, including a ‘ typical ’ dermatitis, justifying a diagnosis of pellagra. The nervous and gastro-intestinal symptoms were mild but distinct. The dermatitis was first noted between September 12 and September 24, 1915, or not later than five months after the beginning of the restricted diet. It is of great interest to note that in all our cases the skin lesions were first recognized on the scrotum. Later there appeared lesions on the backs of the hands in two cases and the back of the neck in one case. The scrotal lesions conformed to the type described and figured by Merk.\* This experience would suggest that the scrotal lesion is a much more common early skin manifestation than has heretofore been believed. It would probably have escaped us but for the fact that it was our routine to examine these men, and the special control group, completely stripped.

“ No person in the ‘ camp ’ not of the volunteer squad has presented evidence justifying even a suspicion of pellagra.”

II. Maclean.

GOLDBERGER (Joseph), WARING (C. H.) & WILLETS (David G.). **The Prevention of Pellagra. A Test Diet among Institutional Inmates.** —*U.S. Public Health Rep.* 1915. Oct. 22. Vol. 30. No. 43. pp. 3117-3131.

An account of experiments in two orphanages and one asylum where pellagra was endemic. In one orphanage, 79 cases of the disease were observed during the spring and summer of 1914 ; in the other orphanage, 130 cases were recognised during the same period. In September 1914 the diet was considerably modified and a decided increase made in the allowance of fresh animal meat and leguminous protein food : the milk supply was also increased and eggs were used freely, while the breakfast cereal (grits) was substituted by oatmeal. As the result of this change no case of pellagra (recent admissions excluded) occurred in the first orphanage during this year, and in the second orphanage only one case was recognised.

Somewhat similar changes of diet in an asylum gave equally satisfactory results. No recurrence of the disease in any of 72 pellagrins in the Institution was detected, while out of 32 control pellagrins kept on the old diet, as many as 15 presented recurrences. In the case of all these experiments, the only change made was in the diet ; the

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\*“MERK (Ludwig). *Die Hauterscheinungen der Pellagra.* Innsbruck, 1909, p. 24, fig. 6.”

environment, sanitation and general conditions remained as before. Applying these observations to the prevention and treatment of pellagra, the following recommendations are made :—

“1. An increase in the diet of fresh animal and leguminous foods, particularly during the late winter and spring. . . .

“2. A reduction in the diet of the carbohydrate (starchy) foods.”

H. M.

GARRISON (Philip E.) & SCHULE (Paul A.). **A Statistical Study of Personal Association as a Factor in the Etiology of Pellagra.**—*Southern Med. Jl.* 1915. Aug. 1. Vol. 8. No. 8. pp. 655-659.

This paper is to try and determine the actual frequency of the occurrence of multiple cases of pellagra in a single household, as compared with the frequency of single cases. A total of 194 families was examined, consisting of 1,023 individuals, living in cotton mill villages, of whom 310 were suffering from pellagra.

The following conclusions were reached :—

“1st. In the endemic centres studied, 42 per cent. of the pellagrous households presented multiple cases. Sixty per cent. of the cases occurred two or more to the household.

“2nd. The age and sex distribution of both first and subsequent cases in the household corresponds roughly with the distribution in general population. Adult females form a considerably larger proportion of first cases in the household than of subsequent cases.

“3rd. When the first case in the household is a house-wife or a child, there is a much greater tendency for the development of subsequent cases in children. When the first case in the household is a wage-earner, subsequent cases in children are extremely rare.

“4th. The time interval between the first and subsequent cases in the household is quite variable. Twelve months is the interval most commonly observed.”

[This paper lacks completeness, because no mention is made of the diet of the families, nor whether each individual of the family ate the same class of food as the other members. Did the adult females, for instance, eat meat in the same proportion as the men ?]

F. M. Sandwith.

KNOWLES (Frank Crozer). **Pellagra in Childhood.**—*Amer. Jl. Med. Sci.* 1915. June. Vol. 149. No. 6. (No. 519). pp. 859-865.

With the exception of one case reported in a boy of five years of age, who came to a hospital in Philadelphia, this paper is an interesting compilation of what many authors have written about pellagra among children.

“Conclusions. Pellagra is of rather frequent occurrence in childhood. In endemic neighborhoods approximately 10 per cent. of the cases occur in children. The disease is rare under two years of age.

“The affection is almost evenly divided between the two sexes in childhood.

“The negro is far less susceptible to the disease than is the white individual, particularly in early life.

“In endemic neighborhoods in about one-half of the cases two or more members of one family are attacked (Siler and Garrison).

“In a considerable number of cases in children, pellagra follows shortly after the exanthemata, particularly measles. In the South, pellagra in children frequently develops in those with hookworm.

"The skin eruption in childhood is quite marked, while in a considerable proportion of cases the gastro-intestinal and nervous symptoms, particularly the latter, are comparatively mild.

"Although formerly the death-rate in children was rather high, at present the disease occurs in a much milder form and the mortality is low.

"Heredity plays no part in pellagra excepting, by lowering the general resistance of the child, the disease is more readily contracted.

"The typical cutaneous outbreak or an accurate history of its former occurrence is essential in making the correct diagnosis of pellagra."

F. M. S.

GALLOWAY (E. H.). **Pellagra in Mississippi.**—*Southern Med. Jl.* 1915. Aug. 1. Vol. 8. No. 8. pp. 691-692.

This is a serious warning from the Secretary of the Mississippi Board of Health to physicians. For the year 1914 there were 10,954 cases reported in the State as compared with 6,991 in 1913. The number of pellagra deaths similarly rose from 795 to 1,192, being exceeded only by tuberculosis and pneumonia. It is emphasized that the duty of every doctor is to feed pellagrins on lean meat, milk, eggs, beans and peas, and more peas and beans should be grown by farmers.

F. M. S.

DORSEY (Rufus F.). **Pellagra. The Cause and the Cure.**—*Southern Med. Jl.* 1915. Aug. 1. Vol. 8. No. 8. pp. 682-686.

The author, in Georgia, has treated 32 cases of pellagra and has come to the conclusion that it closely resembles influenza, and is due to the poisoning of the economy by neurine (or muscarine) which is formed as a result of putrefaction within the tonsils. All cases should, therefore, undergo complete tonsillectomy.

F. M. S.

JOHNSON (J. Clarence). **The Symptomatology, Etiology, Pathology and Treatment of Pellagra.**—*Southern Med. Jl.* 1915. Apr. Vol. 8. No. 4. pp. 279-289; May. No. 5. pp. 366-375.

This is a very discursive account, written by a Professor of Gastro-enterology, based on 50 cases treated in his private practice. He omits changes in the central nervous system and all reference to morbid anatomy. He is not converted to the insufficiency of nutrition theory and believes that factors second to none in importance are "absence of hydrochloric acid, ptosis and dilatation of the stomach."

F. M. S.

HARRISON (J. H.). **Pellagra: with Report of Case.**—*Kentucky Med. Jl.* 1915. June 1. Vol. 13. No. 7. pp. 294-296.

The author has seen ten cases of pellagra, two of which he failed to diagnose some years ago; seven were seen in the Hopkinsville Asylum in 1912, and the tenth is now reported. This patient recovered after Fowler's solution and juice extracted from beef steaks.

The writer says that the disease is "almost exclusively confined to the peasantry of the oriental countries" and considers that the source of pellagra is soil pollution. He also believes that the focus is in the colon and is parasitic in nature, the parasite passing through the intestinal wall in the state of a spore.

F. M. S.

THOMSON (W. F.). **Pellagra ; its Cause and Prevention.**—*Texas State Jl. Med.* 1915. Aug. Vol. 11. No. 4. pp. 220-221.

This writer says he has only seen one case of pellagra during the past year, but he tells us some of the varied beliefs of Texas physicians. In spite of the diversity of their views he states : " the theory that the disease is nutritional and due to lack of sufficient protein food, seems now to be quite generally accepted in America." F. M. S.

WOOD (G. H.). **Pellagra Status in Panola County, Miss., with Remarks on Etiology and Treatment.**—*Southern Med. Jl.* 1915. Aug. 1. Vol. 8. No. 8. pp. 662-666.

The writer of this paper comments very properly upon the prevailing habit of not diagnosing pellagra until the skin eruption appears. He points out that in this way the opportune time for treatment is frequently lost, and also that suicide or homicide, giving rise to medical legal difficulties, might occur in a patient whose skin eruption was delayed. He also combats the habit of some practitioners in eliminating sugar improperly from the diet. He cannot agree that pellagra as a medical disease is frequently relieved by surgery, for it has been gravely pretended that a surgical operation sets up a leucocytosis, thereby relieving the pellagra symptoms. He considers that the intelligent land-owners of the south are indirectly responsible for more deaths than all the inmates of penal institutions. " It is their duty to furnish comfortable, well-screened houses, and to see that the food is sufficient and properly prepared." He inclines to the belief that pellagra is an intoxication which gains entrance through the alimentary canal. F. M. S.

FRAYSER (Benj. Hobson) & SMITH (David O.). **Pellagra in Panama.**—*Southern Med. Jl.* 1915. Aug. 1. Vol. 8. No. 8. pp. 678-682. With 1 chart.

More than one hundred fatal cases of pellagra have occurred in Panama among the natives and the imported West Indians since 1909. Their food consists chiefly of yams, sugar cane, plantains and native fruits, and they eat very little meat, even in hospital, where fresh meat is provided for them. The authors recommend as treatment, rest in bed, fruit juices, meat broths and milk at the beginning and then a carbohydrate-free diet of fresh meat and vegetables. They find cacodylate of sodium, given intramuscularly, a help. F. M. S.

MARCHMAN (O. M.). **A Pellagra Clinic.**—*Texas State Jl. Med.* 1915. Aug. Vol. 11. No. 4. pp. 223-229.

Twenty-five patients and 250 physicians attended this symposium. One speaker was quite certain that pellagra is an intoxication, the next had no doubt that it was insect-borne, while a third maintained that it occurred through the medium of the soil and had been imported from Europe. Two physicians praised very highly picric acid, internally and applied to the skin as gauze, and one of them, Dr. C. A. SEARCY, of Hempstead, maintained that picric acid is as much a specific in pellagra as quinine is in malaria. F. M. S.



BERDUE (F. M.). **Pellagra in the United States.**—*New Orleans Med. & Surg. Jl.* 1915. Sept. Vol. 68. No. 3. pp. 161–168.

The author, a Professor of Tropical Medicine at the Eclectic Medical University of Kansas City, writes in apparent confirmation of Professor ALESSANDRINI's theory, though the paper is put forward as his own, based on studies of the United States Geological Survey. The Italian works are not mentioned but it is stated that in Italy and in the United States, dogs, cats and cattle have pellagra as well as man.

The conclusions are:—

"1. Pellagra is a chronic intoxication caused by colloidal silica in drinking water.

"2. Pellagra is strictly localized and contracted in those regions where the water commonly drunk by the people is derived from clay.

"3. Pellagra is prevented by drinking hard water. Lime can be added to soft water.

"4. Pellagra is cured by the administration of any alkali which will neutralize the silica.

"5. The simplest treatment is the hypodermic administration of a 10 per cent. solution of sodium citrate, once a day at first, later on alternate days.

"6. The remedy has been successful when administered by the mouth. This method requires more, and a longer time."

F. M. S.

MEREDITH (Duane). **A Further Report upon the Etiology of Pellagra.**—*Med. Rec.* 1915. Aug. 21. Vol. 88. No. 8. Whole No. 2337. pp. 312–315.

The author has seen some ten cases during the last six years in Texas and has heard of nearly forty others from patients and doctors. He has never had the opportunity of making a post-mortem examination, but he considers he has "a message that will be worth a great deal not only to the medical profession, but to the human race in general."

In 1913 he claims to have obtained an organism from the blood culture of a feverish pellagrin; he injected this intraperitoneally into a chicken, which became emaciated and was "very nervous before expiring."

A Rhesus monkey was inoculated subcutaneously with one cc. of blood serum culture, after which it lost appetite and weight and had a temporary increase in the pigment of his hands and face. The author thinks that his organism "probably belongs to an unknown fungus family, in which there is a double cycle as occurs in the moss family." He states that the human cycle, as worked out through his cultures, "takes place in about the following manner: The spores of this organism are deposited in the deepest layer of the skin by some blood-sucking insect, where they begin to grow by sending out long fine mycelia that enter the lymph spaces along the basement membrane." He believes both in SAMBON's theory and the maize theory and he found an organism similar to his own "in some bole worms in green corn (maize) that grew close to several cases of pellagra."

He states that his work upon this organism has been done with the most rigid technique. He thinks that "TIZZONI has been working with this organism, but he has studied only one cycle and has used too dry a medium to get typical growth."

[The author describes himself as Formerly Assistant Professor of Bacteriology, Fort Worth University.]

F. M. S.

BIRD (R. Lee). **Pellagra.**—*Kentucky Med. Jl.* 1915. Aug. 1. Vol. 13. No. 9. pp. 385-387.

The author considers that the "50 species of fleas in the United States" should be looked upon with grave suspicion for the spread of pellagra. He believes that the true death-rate of pellagra in the States is 10 per cent. because the usual figures quoted, 30-65 per cent. are derived from asylum statistics where only the last stages of the disease are treated.

[There is nothing to praise in this paper.]

F. M. S.

BOND (H. E.). **The Causation and Treatment of Pellagra.**—*Jl. Trop. Med. & Hyg.* 1915. Oct. 15. Vol. 18. No. 20. pp. 229-231.

Writing from the Jamaica Lunatic Asylum, the author advances the old belief that pellagra is a gastro-intestinal auto-intoxication, or alimentary toxæmia, modified by the sun's active rays. "It would seem quite possible that whatever may be the toxin or toxins in the gastro-intestinal tract that may be the primary cause of pellagra, it is evident that these toxins act on the sympathetic nervous system in the intestines, then on the chromaffine cells and tissue, which, by their close connection with the central nervous system, produces the pigmentation called pellagra, with its resulting degeneration and neuritis." His conclusions are :—

"(1) That pellagra is a disease akin to Addison's disease.

"(2) That the causal bacterium is in the intestines, as indicated by the amounts of indol and skatol present, and that it primarily affects the sympathetic nervous system and secondarily the central nervous system.

"(3) That there are factors in the actinic rays of the sun which can act as irritants to the exposed surface of the skin so as to intensify the condition.

"(4) That it responds to treatment by gastro-intestinal antiseptics internally, and externally by the usual protective ointments."

F. M. S.

TIZZONI (G.). **Sur la Nature Infectieuse de la Pellagra. Résultats de Recherches faites en Italie et en Bessarabie.**—*C. R. Acad. Sci.* 1915. Mar. 29. Vol. 160. No. 13. pp. 398-400.  
**Die Pellagra in Bessarabien.**—*Cent. f. Bakt.* 1. Abt. Orig. 1915. May 14. Vol. 76. No. 4. pp. 48-50.

The author was able to find in 17 new cases the presence of his streptobacillus in the blood and sometimes in the cerebro-spinal fluid and organs of pellagrins. This confirms the findings of 150 other observations often published by him. He found no difference between his bacteriological results in Italy and those in the south-west corner of Russia.

F. M. S.

**TIZZONI (Guido) & de ANGELIS (Giovanni).** **Significato ed importanza del polimorfismo nella identificazione e classificazione dello streptobacillus pellagrae (T.).** [The Significance and Importance of Polymorphism in the Identification and Classification of the Streptobacillus pellagrae (T.).]—*Malaria e Malat. d. Paesi Caldi*. 1914. July-Aug. Vol 5. No. 4. pp. 223-231.

**Bedeutung des Pleomorphismus bei der Identifikation und Klassifikation des Streptobacillus pellagrae (T.).**—*Cent. f. Bakt.* 1. Abt. Orig. 1915. May 14. Vol. 76. No. 1. pp. 47-48.

The authors make another persistent attempt to tell us under how many forms this elusive micro-organism may be seen and they promise us another longer paper on the same subject, which will be illustrated by micro-photographs.

The normal type is said to be a schizomycete, subdivided into a streptococcic form, a bacillary and a staphylococcic form, or even a mixture of any two of these.

The abnormal type is a mycelium, again open to much diversity, owing to involution. The authors claim in their laboratory in Bologna to have thrown light upon the relationship of their streptobacillus with the lower hyphomycetes and its difference from streptococci.

F. M. S.

**RIVISTA PELLAGROLOGICA ITALIANA.** 1915. Sept. Vol. 15. No. 5. pp. 65-70.—**L'Azione della Commissione pellagrologica provinciale di Udine durante l'anno 1914.**

This is an annual report mentioning various details of propaganda among the peasants: demonstration of the fact that maize cultivated in 50 days is of doubtful value as a food, encouragement of potato cultivation, drying chambers for maize, a school of domestic economy, inspectors' visits to markets and railway stations, ovens for cooking maize, free distribution of seed and of food to the poorest, and the issue of 94,564 kilogrammes of salt in this province.

F. M. S.

**RIVISTA PELLAGROLOGICA ITALIANA.** 1915. Sept. Vol. 15. No. 5. pp. 72-78.—**Relazione sui provvedimenti profilattici e curativi attuati durante l'anno 1914.**

This is the annual report of the Pellagra Commission of Vicenza province. The certified pellagrins were 1,612, besides 352 who were apparently doubtful or predisposed to the disease. Seventy-six were cured in two special pellagra asylums.

F. M. S.

**ALPAGO-NOVELLO (Luigi).** **Commissione Pellagrologica Provinciale di Belluno. Relazione del Presidente Dr. Luigi Alpagò-Novello a S. E. il Ministro di Agricoltura Industria e Commercio.**—*Riv. Pellagrol. Ital.* 1915. July. Vol. 15. No. 4. pp. 49-52.

This is the annual report of a Pellagra Commission to the Government of Italy. The inspectors are praised for having made 406 visits to examine imported and indigenous maize. Various agricultural experiments with maize were made and with substitutes such as wheat, beetroot and potatoes.

F. M. S.

VOLPINO (G.). **Nuovi esperimenti e discussioni in difesa del monofagismo.**—*Pathologica*. 1915. May 15. Vol. 7. No. 157. pp. 247-249.

There are no new experiments here, only a criticism of recent papers by RONDONI and RAMOINO, and a complaint that Italian and German authors will not give to the author the credit he desires. He maintains that he was the first in the experimental field to suggest a connection between pellagra and one-sided maize diet. Especially he objects to the credit which has been given by writers to FUNK. F. M. S.

BRAVETTA (Eugenio). **Vitamine e Pellagra.**—*Riv. Pellagrol. Ital.* 1915. May. Vol. 15. No. 3. pp. 43-47.

Many writers are quoted, including FUNK. The author sums up by saying that good food represents the best remedy to assuage, to cure and perhaps to cause the complete disappearance of pellagra. He upholds Professor Rossi, who has suggested that Pellagra Commissions should study the disease *de novo* with this possible solution of the problem in their minds. F. M. S.

HARRIS (Seale). **The Digestive Symptoms of Pellagra.**—*Texas State Jl. Med.* 1915. Aug. Vol. 11. No. 4. pp. 216-219.

The author says very rightly that it is as important in pellagra as in tuberculosis to make an early diagnosis and, therefore, he draws attention to the digestive symptoms which may precede the typical eruption, though patients when cross questioned often confess to "a little sunburn on the backs of my hands every spring." He rejects the theory of insufficiency of nutrition and considers that everything points to the cause being "a gastro-intestinal intoxication or infection, due to the ingestion of a toxic or infectious agent in food." The treatment is to include forced feeding and psychic suggestion. F. M. S.

BROWNSON (W. C.). **An Unusual Condition of the Nails in Pellagra.**—*Southern Med. Jl.* 1915. Aug. 1. Vol. 8. No. 8. pp. 672-675. With 2 figs.

Two good photographs show a leuconychia, a white band crossing the nails transversely. The author recognizes that this condition is rare, and assumes that there must be some tropho-vasomotor cause for it. F. M. S.

MACKEE (George M.). **A Case of Pellagra in New York.**—*Jl. Cutan. Dis. including Syph.* 1915. May. Vol. 33. No. 5. Whole No. 392. pp. 365-366. With 1 plate.

Though many imported cases have been reported in New York State, this is said to be only the third indigenous case. The patient, a sister of charity, was born in New York City of Italian parents. Her typical rash, diarrhoea, loss of weight and melancholia improved under the influence of rest, diet and tonics. She is said to have eaten maize meal only occasionally. F. M. S.

**DRUMMOND (J.). Pellagra in Durban.**—*S. African Med. Rec.* 1913. Oct. 11. Vol. 11. No. 19. pp. 416-418.

This is an account of the first case ever reported in Natal; it occurred in a Kaffir shepherd, who died after about six weeks in Addington Hospital. In addition to a typical eruption, raw tongue, emaciation in spite of voracious appetite, diarrhoea, anaesthesia, twitching of muscles and delusions, he had a cavity in the upper lobe of the left lung and pyonephritis, verified by post-mortem examination.

Two other cases have been seen by the author in Durban, while Dr. ADDISON is quoted as having seen similar cases among prisoners in Natal in 1906 and Dr. KNIGHT, in discussing the present paper, said that he saw a series of cases in 1907 from the Tugela Valley, though the Health Officer disagreed with his diagnosis of pellagra.

F. M. S.

**BARCROFT-ANDERSON (J.). Notes on a Case of Pellagra.**—*S. African Med. Rec.* 1913. Oct. 25. Vol. 11. No. 20. pp. 436-437. With 1 fig.

This case is that of a coloured girl at East London, who died after 80 days. The photograph does not show the rash very well, but it looks like pellagra. Very few details are given.

F. M. S.

**ROSS (D. W.). Notes on a Case of Pellagra.**—*Rev. Neurol. & Psychiat.* 1914. Vol. 12. pp. 214-249.

This author writes from the Royal Edinburgh Mental Hospital, where a case of pellagra was reported in 1909. He saw several cases of this disease in America, but he does not seem to be well acquainted with the symptoms or the morbid anatomy. A girl was admitted for the second time to the hospital, with mild delirious insanity, and exaggeration of tendon reflexes. Two months later (September) she had a severe attack of diarrhoea, accompanied by a rash on the dorsum of both hands with redness of the cheeks and forehead, described by the nurse as a "very bad sunburn." Further evidence of pellagra were the continuation of the diarrhoea, progressive weakness and emaciation, dry red tongue, mental confusion and incoherence. She died on November 26th of the same year, after diffuse clonic muscular twitchings which lasted two days. The author states that "the pathological findings are quite in accordance so far as they go with those of pellagra." But he also tells us that the spinal cord was not examined at the autopsy, which is curious and regrettable in a mental hospital. [It is difficult to tell whether this was a case of pellagra or not.]

F. M. S.

**LITTLE (E. G. Graham). Case of Diagnosis ? Pellagra ? Addison's Disease.**—*Proc. R. Soc. Med.* 1915. July. Vol. 8. No. 9. (Dermat. Sect.) pp. 245-246.

A twelve year old boy, living in Poplar, had suffered for six months from headache, loss of appetite, vomiting and asthenia, resulting in extreme emaciation. At the time of examination there was a genera

desquamation of skin and follicular keratosis, while on the dorsum of the hands, on the nape of the neck, on the lower abdomen, genital area and upper part of thighs, there was deep walnut-hued pigmentation of the skin, but no pigmentation of the mucous membranes.

[This might be a rare youthful case of Addison's disease. It was apparently not pellagra.]

F. M. S.

SMITH (C. A.). **The Treatment and Prevention of Pellagra.**—*Texas State Jl. Med.* 1915. Aug. Vol. 11. No. 4. pp. 221-222.

This writer has seen 20 cases, all of which were treated with arsenical injections; they recovered, but he now thinks that the liberal diet which he insisted upon, milk, eggs, red meat, beans and peas had more to do with the cure than the drugs. He suggests, quite pertinently, that institutional treatment is as necessary for pellagra as for tuberculosis.

F. M. S.

SHAW (Thad.). **The Causation and Treatment of Pellagra.**—*Med. Rec.* 1915. Aug. 14. Vol. 88. No. 7. Whole No. 2336. pp. 275-277.

The author in Texas has come to the definite conclusion that pellagra is essentially a metabolic or nutritional disease and, therefore, ought to be treated by rest in bed, hospital regime, liberal diet, including fresh meat, and tonics. He also advises Texans, when possible, to migrate during the summer to the snows of Colorado to get away from undue exposure to heat and sunlight. He has seen pellagra in the "untidy wards" of the Austin Lunatic Asylum, where beriberi has also occurred, necessitating the exclusion of rice from the Asylum dietary. He mentions, with disfavour, several drugs which are apparently vaunted as cures for pellagra in the United States.

F. M. S.

LITTLE (Y. A.). **The Dietetic Treatment of Pellagra, with Report of Eleven Cases.**—*Southern Med. Jl.* 1915. Aug. 1. Vol. 8. No. 8. pp. 659-662.

These eleven cases were treated in the Georgia State Lunatic Asylum, and no drugs were given except in two cases, where pepsin relieved indigestion. One woman died because she obstinately refused nourishment, and after being tube-fed she purposely vomited as much of the food as she could. The cases treated with liberal diet, eggs, milk, vegetables and beef, improved, though they included seven individuals with dementia praecox, two maniacs, one imbecile and one with great mental depression. The author considers that the treatment of the disease is wholly one of diet.

F. M. S.

BOOTH (B. H.). **Pellagra Treated with Cacodylate of Sodium. Report of Sixteen Cases.**—*Southern Med. Jl.* 1915. Aug. 1. Vol. 8. No. 8. pp. 676-677.

These cases were mostly negroes, farm hands living on maize meal, fat meat, rice and corn syrup of a cheap quality. The author has found more success from intra-muscular injections of cacodylate of sodium than from any remedies, including arsenic, by the mouth.

F. M. S.

FINATO (L.) & NOVELLO (F.). **Trattamento profilattico contro la pellagra.**—*Riv. Pellagrol. Ital.* 1915. May. Vol. 15. No. 3. pp. 34-38.

**Trattamento profilattico della Pellagra.**—*Pathologica.* 1915. May 1. Vol. 7. No. 156. pp. 221-222.

Two disciples of Professor VOLPINO write from a pellagra asylum in Verona that they have treated 14 early cases of pellagra on alternate days with injections of extract of maize in gradually increasing doses. They have been able to trace 12 of the patients and claim that these suffered less during the succeeding spring and summer than similar cases who had not undergone this special treatment. They therefore warmly praise this method as a prophylactic.

F. M. S.

PALMER (Ernest E.) & SECOR (William Lee). **The Treatment of Pellagra by Autoserotherapy.**—*Jl. Amer. Med. Assoc.* 1915. May 8. Vol. 64. No. 19. pp. 1566-1567.

The authors, writing from Texas, believe "that the benefit derived from the old-time blister in pneumonia was not due simply to counter-irritation but that its effect was due to antigen produced in the serum and re-absorbed, thus stimulating the production of antibodies." Encouraged by this belief, they have blistered the chests of seven pellagrins and have then injected one cc. of the resulting serum into the patient's arm. The treatment was repeated every week for a few weeks. It is claimed that all the seven patients improved under these injections, but three of them disappeared and "were lost track of."

F. M. S.

NILES (George M.). **Some Suggestions concerning the Treatment of the Gastrointestinal Symptoms of Pellagra.**—*Med. Rec.* 1915. July 31. Vol. 88. No. 5. Whole No. 2334. pp. 187-188.

The author has treated 800 cases of pellagra in Georgia and gives the various prescriptions which he has found of most use for inflamed mouth, nausea, indigestion, constipation and diarrhoea, all of which are caused by irritation of the central nervous system. Gastric lavage is seldom necessary. For diarrhoea, tannigen, kino, catechu and bismuth are useful, or pint enemata of pure kerosene oil on alternate days. The diet should be as liberal as practicable, and must include fresh meat and either dried beans or peas, and all maize products should be prohibited.

F. M. S.

FOSSIER (A. E.). **Report of a Case of Pellagra treated with Tri-Sodium Citrate.**—*New Orleans Med. & Surg. Jl.* 1915. May. Vol. 67. No. 11. pp. 902-903.

The author read an article on the treatment recommended by Professors ALESSANDRINI and SCALA. He gave to a man cacodylate of soda for 25 consecutive days and also daily hypodermic injections of tri-sodium citrate. At the end of 10 weeks "all visible evidences of pellagra, the skin lesions, the mental conditions and the gastrointestinal disorders had disappeared." He is greatly tempted to ascribe the cure to the sodium citrate.

[No mention is made of diet.]

F. M. S.

RONDONI (Pietro) & MONTAGNANI (Mario). **Lesioni istologiche nel maldismo, nel digiuno e nello scorbuto sperimentale.** [Histological Lesions after Exclusive Maize Diet, Starvation and Experimental Scurvy.]—*Sperimentale*. 1915. Aug. 30. Vol. 69. No. 4. pp. 659-696. With 2 coloured plates and 3 figs.

From experiments on guinea-pigs fed only on maize, the authors find that the organs chiefly affected are the spleen, thyroid gland and suprarenals, and after them the central nervous system; with less effect on the liver, digestive canal, kidneys, bone marrow, myocardium and lungs. Special attention is drawn to the grave lesions of organs of internal secretion, such as the thyroid, suprarenals and perhaps the pancreas, and they claim that sclerosis of the thyroid is enough to distinguish "maidism" from the results of starvation. After death from the maize diet they do not find such marked haemorrhagic lesions as in experimental oatmeal scurvy, but they do find prominently diffuse degenerative lesions of the nervous elements of the central nervous system. In spite of the comparative absence of intestinal lesions in the guinea-pigs, as contrasted with the well known diarrhoea of advanced human pellagra, they believe that their pathological studies help to admit pellagra into the group of diseases due to deficiency of nutrition. The coloured plates show that sections of the suprarenals of guinea-pigs resemble much more closely the glands of animals which have been starved than they do the normal glands.

F. M. S.

RONDONI (Pietro). **Ricerche sulla alimentazione maidica con speciale riguardo alla eziologia della pellagra.** [Maize Diet from the Point of View of the Etiology of Pellagra.]—*Sperimentale*. 1915. Aug. 30. Vol. 69. No. 4. pp. 723-797. With 9 charts.

Much of this paper consists of a resumé of the writings of various authors; sifting them and adding his own experiments the writer says that we ought to conclude that maize is an unsatisfactory and insufficient food for man and for various animals. From his experiments on guinea-pigs he thinks it likely that the anti-maize vitamine is different to the anti-scurvy vitamine. He still holds the old belief that the food value of maize differs according to the kind of maize and the district in which it is grown. Adrenalin administered to sick and emaciated guinea-pigs, by mouth, under the skin or intraperitoneally caused them to live several days longer than the control animals, which were apparently suffering from "hypo-adrenalism." In spite of the obvious difficulties he considers that the effects of a prolonged maize diet, which should be almost exclusive, should be studied on monkeys or on man. Believing that pellagra may be grouped with scurvy and beriberi, he recommends as prophylaxis the substitution for some of the maize of the peasant's diet of other cereals, potatoes, fresh vegetables, meat and milk. He says that now we can go a step further than LOMBROSO, who fought so valiantly to get bad maize forbidden; we must now recognize that exclusive or nearly exclusive consumption of good maize is pernicious to man and must some day be regulated by law.



Experiments were also made upon guinea-pigs and several additions were made to their maize diet, with no very conclusive results—protein, peptone, amino-acids, glucose, tabloids of thyroid gland, allantoin, etc.

F. M. S.

ALBERTONI (P.) & TULLIO (P.). **L'alimentation maïdique chez l'individu sain et chez le pellagreu.**—*Arch. Ital. de Biol.* 1914. Mar. Vol. 62. No. 3. pp. 305–325.

The authors find that although there have been many maize observations on the healthy man, there have been relatively few on pellagrins. They state that the theory of insufficient nutrition by maize was first advanced by LUSSANA.

They watched very carefully in the house of one of them in Bologna a man and two boys with skin lesions and occasional diarrhoea. For four days they partook only of polenta and kidney beans, then for five days polenta only, seasoned with butter, oil, lard, tomato sauce and thin soup. Then for four days they each had 100 grammes of meat per day, with bread, rice, cheese, oil, butter and wine, while for the remaining five days of the experiment (18 in all) they were given 200 grammes of meat per day. The excreta were carefully weighed and tested and it was found that there was a loss of nitrogen per cent. on the maize diet, and again on the meat diet. The authors state that maize food is so insipid that the peasants voluntarily reduce, especially in the winter, their food to a minimum quantity; it therefore results that the diet of the peasants becomes one of the lowest known as regards nitrogen. They insist that a maize diet is insufficient for man, not from the absolute deficiency of nitrogen, but because there is a relative deficiency of the nitrogenous products which are necessary for animal albumins. The addition of 100 grammes of meat daily, they consider, "is the only method of curing and perhaps of completely banishing pellagra." [It is a pity the experiment was so brief.]

F. M. S.

NITZESCO (J. J.). **Sur la valeur nutritive du maïs de nouvelle et d'ancienne récolte.**—*C. R. Soc. Biol.* 1914. Dec. 3. Vol. 77. No. 33. pp. 583–586.

This is a communication from the Bucharest Institute of Physiology. The experiment was made on six hens for 40 days, six cocks for 41 days and six white rats for 33 days.

The excreta were examined for three or four days. The conclusions were: (1) fresh maize is less digestible and less assimilated than old maize; (2) rats stand less well than poultry on an exclusive maize diet.

The old maize varied in age from one to three years.

F. M. S.

NITZESCO (J. J.). **Recherches sur l'alimentation maïdique exclusive chez les animaux.**—*C. R. Soc. Biol.* 1915. May 14. Vol. 78. No. 8. pp. 222–224.

Six dogs in Bucharest were divided into three pairs. The first pair were fed on polenta made from fresh maize; the zeinolytic ferment

appeared in the blood 100 days after the beginning of the experiment, also rapid emaciation, loss of appetite and gaiety, salivation, rash on the mucous membrane of the mouth, with liquid, slightly bloody motions. After death had occurred small ecchymoses were found under the intestinal mucous membrane. The second pair were fed on polenta made from maize one year old; the ferment appeared in the blood after 102 days, while the symptoms and post-mortem signs were similar to the first pair; in addition, there was an exfoliating eruption on the skin of the belly of one dog. The other dog ate comparatively little polenta and remained in good health.

The third pair were fed on bread and remained healthy and happy.

The author states that the ferments found in the blood are a proof that the dogs were poisoned by zein.

He considers that this poisoning, preceded by the alimentary insufficiency of maize, are among the chief causes of pellagra.

F. M. S.

**RUHL (Karl). Experimenteller Beitrag zur Aetiologie der Pellagra.**

[Experimental Contribution towards the Etiology of Pellagra.]—

*Dermatol. Woch.* 1915. Jan. 30. Vol. 60. No. 5. pp. 113-126;

Feb. 6. No. 6. pp. 151-158; Feb. 13. No. 7. pp. 176-180.

In Turin guinea-pigs, white rats and captured black rats were kept 35-40 days to make sure they were healthy, and were then fed on the best possible maize and were exposed to sunlight. A second lot were given a diet of bread, potatoes, meat, cheese, fruit, etc. for the rats, while the guinea-pigs fed on grass, cabbage, bread, lettuce, etc., and were also exposed to sunlight.

A third lot were fed at first exclusively and then chiefly on maize, and were exposed to light through red glass. A fourth lot were fed on mixed diet, excluding maize, and under the same light conditions as group 3.

A fifth group were kept in the dark and were fed on that part of the maize which, according to FUNK, does not contain the vitamins. This part, consisting roughly of husk and layers of skin under the husk, was never eaten by the animals so long as they had plenty of maize. The sixth group, like the first, was exposed to sunlight, but was fed only on the parts of maize rejected by group 5, i.e. the parts alleged by FUNK to be rich in vitamins. A seventh group was treated like group 6, except that they were kept under red light. The animals were kept four or five in a cage and the author points out that a loss of hair is generally caused by rubbing against the bars or by the habit of the healthier animals, who bite off the hairs of the sick ones. He found that no photodynamic reaction takes place in guinea-pigs, and that these animals are not suitable for these experiments, because they all die and nothing noteworthy was found after death, except a redness and swelling of the adrenals. Red light, even with mixed diet, delayed the development of young animals, but had no effect on adults. Red light, with exclusive maize diet, resulted in the death of 80 per cent. He believes that the red light is not harmful, but rather the exclusion of the chemically active violet and ultra violet rays. His final conclusions are that FUNK's vitamin theory is non-proven and that RAUBITSCHER is mistaken in considering pellagra to be a photodynamic problem.

F. M. S.

ANTONINI (G.). **L'opera di Gaetano Pini nella lotta contra la Pellagra nella Provincia di Milano.** [The Share of G. Pini in the Struggle against Pellagra in Milan.]—*Riv. Pellagrol. Ital.* 1915. May. Vol. 15. No. 3. pp. 39-42; July. No. 4. pp. 53-54.

The Milanese authorities have lately given to one of their streets the name of Dr. GAETANO PINI in recognition of his life's work in every field of hygiene. At the age of 20 years he broke off his medical studies to fight under GARIBALDI in 1866. In 1881 he was made one of four commissioners to study the best methods of fighting pellagra in the province of Milan, one of his colleagues being E. STRAMBIO. His enthusiastic admirer tells us the various projects initiated by PINI until his early death in 1888. His personality is said to have been such that he succeeded in interesting even those of the Government who were indifferent to the pellagrà problem.

[This was a gift which many would-be reformers must envy.]

F. M. S.

## BOOK REVIEWS.

GABBI (Umberto). *Trattato Elementare di Patologia Esotica ad uso di Medici e Studenti*.—xv + 347 pp. S. Roy. Svo. With 3 plates and 69 text-figs. 1915. Roma: Tipografia Nazionale di Giov. Bertero. E. C. [Price not stated].

This is an elementary work on what are generally called tropical diseases though as is well known many maladies thus included are not confined to the tropics. Their influence, however, has been most felt by white races in the attempt to colonise, or to extend trade in hot climates. It is this fatal obstruction to progress which has called particular attention to tropical diseases and to the methods best fitted to fight or eradicate them. Professor Gabbi dedicates his book to Professor BACCELLI, from whose pen comes a short introduction to this treatise by a disciple and friend. The chief point to be noticed with regard to Professor Gabbi's book is that it is issued as a text book for students and medical practitioners. It is therefore necessary to judge the contents of the book according to the wants of these two classes.

It must be clearly stated that the author makes no claim to exhaustive treatment of the subjects dealt with. In the penultimate paragraph of his preface Professor Gabbi describes the aim and purpose of his book. He states that he does not intend to give a complete picture of the present state of the pathology of tropical diseases but to set out the necessary elements. Here the reviewer may digress for a moment to point out that "Patologia" has a wider meaning than "Pathology," the English equivalent. The Italian term includes etiology, symptoms and treatment in addition to pathology as generally understood by the English student.

It may be fairly expected that a work claiming the title of "Elementary Treatise" shall contain all the known and accepted facts relating to the diseases included within its covers. Theories and disputed points may be left to more comprehensive text books or to monographs. Judged by such a standard it may be said at once that Professor Gabbi's work is on the whole, satisfactory. Generally speaking the student will find all he needs to know during the period of life devoted to examinations and until he comes under the more satisfying guidance which comes from actual research and experience. Chapters I to VII deal with infective "fevers" of bacterial or doubtful origin including "seven day fever," "dengue," "yellow fever," "typhus," "undulant fever," "cholera," "plague," and "leprosy." All these are carefully considered and each section is followed by a fairly full bibliography.

"Malta fever" (Febbre di Malta o del Mediterraneo) should not be used as the "heading" for chapter IV. The disease is not even most prevalent in that island and for many years "Undulant fever" has been accepted as the title-in-chief for the malady caused by the *Micrococcus melitensis*. The medical profession must have observed with feelings of pride and pleasure the honour lately bestowed, in the form of the Leeuwenhoek medal, upon Sir David BRUCE, the discoverer of the cause of this most serious disease. Chapter IV is one of the best in the book and "undulant fever" is a malady to which Professor Gabbi has devoted much attention and concerning which he contributed a paper to the records of the International Medical Congress in 1906. Chapter V on cholera is equally good and contains the methods of treatment used with great success by Sir I. ROGERS in Calcutta. Chapter VI deals with plague. It seems somewhat unnecessary and out of place to add a section on "Climatic Bubo" as an appendix to this chapter. It is generally admitted that the so-called "climatic buboes" do not contain the plague bacillus, nor are they accompanied by symptoms of plague. Indeed it would seem that the word "Climatic" is a cloak for ignorance of the true cause of these buboes. The name "Pestis minor" seems even more unsatisfactory. In accordance with Professor Gabbi's method of classification this chapter also includes leprosy and dysentery due to bacilli. The reviewer has no experience

of the sugar-reactions but, if they are always reliable, they will help the student to distinguish between the bacilli of Shiga, Flexner, Strong and Hiss for what such distinction is worth. We pass on to Chapter VII. and diseases due to pathogenic protozoa. First comes in natural sequence Amoebic dysentery and Professor Gabbi gives *Entamoeba tetragena* and *E. histolytica* as separate species. The reviewer agrees with those who regard them as one and the same. Everyone should read a concise and illuminating article on the intestinal protozoa by Dr. C. M. WENYON which appeared in the *Lancet* for November 27th.

There is no doubt that ROGERS has done well to re-introduce and to insist upon the value of emetine in amoebic dysentery. In bacillary and possibly in mixed forms of the disease if the patients are kept in bed and on "milk diet," other drugs give equally good results especially sulphate of magnesia in saturated solution.

Malaria and kala azar receive full treatment and a section is devoted to "Delhi Boil" and other sores due to infection with *Leishmania tropica*. When the section dealing with sleeping sickness and trypanosome infections was written *T. rhodesiense* was accepted as a separate species responsible for the "Nyasaland Sleeping Sickness" and carried by *Glossina morsitans*. Surgeon-General Sir David BRUCE, A.M.S. believes, as stated in his "Croonian Lectures" [vide the *Lancet*, June 26th, 1915, *et seq.*] that *T. rhodesiense* and *T. brucei* "are in reality one and the same. They are identical in morphology, in their action on animals, and in their manner of development in the tsetse fly, and until further proof is brought forward that they are separate species the Commission decided to consider them as identical."

In the Bibliography at the end of this section the *Tropical Diseases Bulletin* is referred to.

Chapter IX. includes diseases due to Spirochaetae: Relapsing fever, Tick fever, Yaws and Granuloma. Verruga is considered as probably due to infection with Chlamydozoa and Barton's "bodies" as seen in the red blood corpuscles are described in Chapter XI. The description of the various forms of "Ringworm" in Chapter XII. is somewhat brief and the names given to the different species of Tricophyton are those used by CASTELLANI. Iodine and chrysophanic acid are recommended for the treatment of Tinea but no reference is made to the value of X rays in dealing with these infections. In Chapter XIV. the various theories as to the causation of Pellagra are discussed and microphotographs of the *Streptobacillus pellagrae* of TIZZONI and De ANGELIS are shown, but we are still without any satisfactory conclusion as to the true cause of this disease. Thirty-six pages are devoted to parasitic worms and the sections are generally complete and well illustrated, the picture of *Cyclops quadricornis* containing larvae of *F. medinensis* being especially interesting. The section which follows on insects connected with disease is scanty and unsatisfactory, nor do the bibliographies contain any reference to the best of existing works on Entomology in medicine. The essay on beriberi is good and the theory of vitamins is fully accepted. The remaining sections deal with Vegetable poisons, Snake venom, Sunstroke, and the slow action of tropical climates. They are, like the section dealing with insects, brief and insufficient.

The illustrations are generally good and well chosen. Many are original and taken from cases observed by the author. Of the borrowed illustrations some are acknowledged and some are not referred to their source. Fig. 64, p. 285 does not show the details on the head of *Necator americanus* very plainly.

In addition to the bibliographies there is at the end of the book a list of various works consulted. It is to be noted that among these we find the following entry:—"Daniels and Wilkinson, *Trop. Med. & Hygiene*, London, 1909 (2 Vol.)" [sic.] The first volume certainly appeared in 1909, but the 2nd vol. by DANIELS and ALCOCK was published in 1910, and the 3rd by DANIELS in 1912. The 2nd volume of this work is not found in the bibliography attached to the section on Snake bite; yet Fig. 69 on page 338 of the work under review is without doubt ALCOCK's Fig. 94, p. 215, vol. ii. of "*Tropical Medicine and Hygiene*."

Professor Gabbi's book would be more useful both to practitioner and student if it was furnished with an Index. The "Indice" is merely a bare "table of contents." At the end of the book is found a list of "errata corrigenda." It is not quite complete: On p. 106 the zoological name of the "Tarabagan" is given as: *Arctomys bobae*; on p. 156 (Bib.) "fuertlier" and "attributed" are found and on p. 261 we find "jodio" for iodio.

J. H. Tull Walsh.

**CUERVO MÁRQUEZ (Luis), [Dr.]. Geografía Médica y Patología de Colombia. Contribucion al estudio de las Enfermedades Inter-tropicales.** [The Medical Geography and Pathology of Colombia. A Contribution to the Study of Tropical Diseases.]—219 pp. With 1 map and 2 plates. 1915. Bogotá. New York: Libreria Colombiana, Camacho Roldan y Tamayo. [Price not stated].

This well-arranged and clearly written volume furnishes an admirable account of the medical topography and diseases of the great South American State of Colombia, a country which, as the author points out, has an area three times as great as that of either France or Germany, and therefore five times as large as that of the United Kingdom. The population at the present time amounts to about five millions of inhabitants in all, including both Europeans and those of native descent.

Colombia lies wholly between the 2nd S. and 12th N. parallels of latitude, and therefore the climate at the sea-level is strictly tropical; nevertheless on the plateaux of the highlands the climate is so rigorous that both men and animals are frequently frozen to death in blizzards. The great river Magdalena, running from south to north through the mountain chain of the Cordilleras, forms the principal means of communication with the interior of the country, though the plains of the eastern portion of the Republic are also brought into connection with the neighbouring territories of Venezuela and Brazil through the head-waters of the Orinoco and the Amazon. A very excellent map, of United States origin, forms the frontispiece to the present volume and brings all these features clearly to the notice of the reader.

The usual tropical diseases of this region of the world, such as yellow fever, malaria and ankylostomiasis, are of course prominent in Colombia, while leprosy and a special form of relapsing fever also occur. The latter is due to a species of *Spirochaeta* which is communicated by the bite of the tick, *Ornithodoros turicata*, though a bug, *Cimex rotundatus*, and *Argas reflexus* and *marginatus* are also incriminated as transmitters. Goitre is endemic in some of the higher regions of Colombia, and by the inhabitants is always attributed to calcareous drinking water, obtained from fountains or shallow wells. The city of Bogotá in former times presented a large number of cases of goitre, but since its supply of water has been altered to one derived from a stream, goitre has become relatively rare, and so with other localities. Whether these calcareous surface-springs harbour an organism which is the cause of the disease is, according to the author, a matter for consideration.

One of the ailments peculiar to Colombia is the peculiar form of alcoholic intoxication caused by drinking, in excessive quantities, the fermented beverage derived from maize, called Chicha. Chicha contains about 8 per cent. of alcohol, along with measurable quantities, say 1 to 2 per cent., of glycerine, lactic acid and dextrine. It is therefore not unlike a weak wine, and is very cheap, so that it can be consumed by drunkards in quantities varying from 2 to 3 litres per day, containing from 150 to 250 grammes of alcohol. The drinking of Chicha does not, however, seem to produce cirrhosis of the liver, but, on the other hand, it causes a peculiar eruption on the hands and feet not unlike that seen in pellagra. It also produces a peculiar form of neuro-muscular paresis of the limbs, so that voluntary movements are performed slowly and with much difficulty,

though there is not much real loss of muscular power. Patients may have to be detained in hospitals for some weeks through these symptoms, though they eventually recover, at any rate for the time.

Tuberculosis has of recent years become much more common in Colombia, from the immigration of sufferers from pulmonary phthisis in search of mountain-cures in the Cordilleras. For these there has been as yet no adequate provision made, with the result that phthisis has been disseminated among the local populations, as in other regions of the world. In the rainy tropical districts of Colombia, the parti-coloured skin eruptions, due to various species of *Aspergillus* and known as Carate, are much in evidence, and by the laity are always ascribed to bad drinking-water. A species of *Simulium* and one of *Acanthia* are the probable transmitters, as the disease is contagious.

As an adjunct to the perusal of ordinary works of travel dealing with Colombia, like Mr. H. J. MOZANS' interesting book "Up the Orinoco and down the Magdalena," this account of the medical topography and pathology of the country will be found very useful.

J. B. Nias.

WARD (Espine). [M.D., B.C.H., B.A.O.]. **Beri-beri. Its Etiology, Symptoms and Treatment, with a Detailed Clinical Account of Thirty-Two Cases occurring in Sierra Leone.**—84 pp. 1915. Belfast: Mayne, Boyd & Son, Ltd. [Price 3s. 6d. net.]

This monograph of 84 pages is the author's M.D. thesis and is divided into two parts: (1) A general survey of the disease and its etiology, and (2) Observations on 32 cases of beriberi treated at the prisons of Freetown, Sierra Leone. In the discussion of the etiology the work of BRADDON, FRASER, and more especially SCHAUUMANN is set out, but that of CHAMBERLAIN, STRONG, VEDDER and many others is ignored. The object of the author "is to show that under certain conditions hand milled rice will produce beriberi"; this really requires no long argument, for it had been frequently pointed out that the vitamin deficiency is a very complex question, and hand milled rice alone is a deficiency diet. The question of the relationship of beriberi and scurvy is just touched on, but DARLING's observations are not noted.

The description of the thirty-two cases observed by the author himself is very interesting and contains much useful information, giving no support to the infective theory but strong evidence of dietary deficiency and faulty metabolism. All the patients lived on Sierra Leone hand milled rice or native rice *alone*; those taking the full prison diet were not affected. The mortality was 22 per cent.

P. W. B-S.

HARVARD SCHOOL OF TROPICAL MEDICINE. **Report of First Expedition to South America 1913.** [Members of the Expedition:—Richard P. STRONG, Ernest E. TYZZER, Charles T. BRUES, A. W. SELLARDS, J. C. GASTIABURU.]—xiv + 220 pp. Imp. 8vo. With 48 plates, 9 text figs. and 1 chart. 1915. Cambridge: Harvard University Press.

The greater part of this handsome volume is concerned with Oroya fever and verruga peruana. Most of the work has been previously published and summarised in this *Bulletin*. Owing however to its obvious value and the fact that the previous accounts are scattered, it is deemed advisable to give a somewhat full summary of this portion.

In the introduction a general account is given of the route of the expedition, some of the towns visited and the diseases studied. Most of the work was done in Peru. It is pointed out that in the deep valleys separated by mountain ranges and so near the equator there is a very unusual flora and fauna and the existence of unusual diseases is not surprising.

Chapter 2 is headed General Consideration of Oroya fever and of *Verruga peruviana*, hitherto believed to be the same disease. An affection characterised by fever, anaemia, and a nodular eruption on the skin has been known in Peru from remote times. In a history of the conquest of Peru by ZARATE (1545) it is stated to be more destructive than small-pox. In 1870 an outbreak of fever among the workers building the Central Railway between Lima and Oroya carried off at least seven thousand; hence the name Oroya fever. CARRION's self-experiment was made in 1885; none of the records of his case have been preserved and it has been suggested that he died of typhoid or septicaemia. In 1908 ODRIOLZA's monograph appeared, "the most excellent and most comprehensive account of the disease which has been written." The previous views regarding the aetiology are given, showing that at the time of the Expedition the aetiology of verruga and Oroya fever was undetermined. As a result of their own investigations the authors have concluded that these diseases are distinct, verruga peruviana being due to a virus which can be transmitted to animals by direct inoculation and produces definite lesions in them, Oroya fever being due to an organism parasitic in the red blood corpuscles and endothelial cells and sufficiently distinct from other haematozoa to be placed in a new genus. This organism has not been successfully transmitted to the lower animals.

Chapter 3 deals in detail with Oroya fever [pp. 15-56.] Knowledge of the distribution of this disease is very incomplete, it having been confused so often with verruga peruviana, malaria, and paratyphoid. The authors think it may well be found to occur in other tropical countries, the difficulty in detecting the parasite having led to its escaping recognition. The clinical features of the disease are detailed, with cases. It is pointed out that a malarial attack during the incubation stage of verruga has often led to an erroneous diagnosis of Oroya fever stage of verruga. Similarly with paratyphoid; hence the isolation of bacilli from cases of supposed Oroya fever. The authors' account of the symptoms is based on the study of apparently uncomplicated published cases and their own observations. The fever is irregular, the changes in the blood characteristic, so that the disease is sometimes termed "anaemia perniciosa de los quebradas" [ravines]; the mortality is given as from 30 to 40 per cent. A concomitant infection with verruga and Oroya fever sometimes occurs.

The section headed Description and Classification of the Parasite of Oroya fever is illustrated by several excellent plates both of fresh and stained specimens. These bodies, named *Bartonella bacilliformis*, consist of minute rods and, more rarely, of rounded bodies within the red cells. Other stages of development are found in the endothelial cells of blood vessels, particularly those of lymphatic glands, liver, and spleen. The bodies are frequently difficult to detect in fresh blood preparations. For further details the report must be consulted.

Experiments to infect rabbits (8) and monkeys (1) with blood from one or other of two human cases were negative, as were attempts to cultivate micro-organisms from the blood of two cases. The authors had no opportunity to study the manner of transmission of the disease; some experiments with mosquitoes (a new genus: *Phalangomyia*) were negative; they think it "very probable that it is transmitted by the bite of some arthropod."

The account of the pathology and histopathology is full and well illustrated. Marked changes were found in the liver, spleen, bone marrow and lymphatic glands: in the liver—extensive areas of necrosis of the central type apparently due to the action of a toxin; in the spleen, numerous infarctions; in both, as well as in the bone marrow—endothelial phagocytes containing red blood cells and polymorphonuclears, probably an indication of the presence of a toxin; in the lymphatic glands—the presence of large swollen endothelial cells, free in the lumen of the blood-vessel or still attached to the walls. The large intestine showed ulcerations with distinct undermining of the mucosa. [For further details see this *Bulletin*, Vol. 5, p. 368.]



Chapter 4 [pp. 57-160] concerns verruga peruviana. This disease is said to be confined to South America between 6° and 13° south latitude. It is probably found in Ecuador and the northern parts of Chili. It may be identical with the "angiofibroma cutis circumscriptum contagiosum" of BASSEWITZ, found in southern Brazil at about 20° S. It particularly affects deeply cleft, narrow valleys on the western slopes of the Peruvian Andes at 2,800 to 9,000 feet, where rain is absent during the greater part of the year. The vegetation of these is shown in photographs. The disease is most prevalent in March and April at the close of the rainy season. The causation was at the time of the Expedition quite unknown. The authors, as stated above, have demonstrated that there is a specific virus. The incubation period is given as from about 14 to 21 days. The clinical features are described at length with cases and numerous coloured plates showing the characters of the eruption. They state that the uncomplicated disease is very rarely fatal.

The experiments relating to the virus occupy 50 pages. The results of the inoculations into rabbits, dogs, guinea-pigs, and monkeys are given in tables. Large numbers of these animals were used. The monkey was most satisfactory, though the inoculation often fails. "If the skin over the eye is scarified and a small portion of a verruga nodule rubbed into the abrasions, after an incubation period usually of ten to twenty days small papules appear which gradually enlarge and later assume the typical picture of the verruga nodule as seen in human beings." The virus has been passed through twelve successive series of monkeys. No generalised eruption occurs in this animal; as in small-pox a modified form of the disease develops. Characteristic lesions may be produced in the testis of the dog and rabbit by inoculation into that organ. It would appear that the virus is only transmissible during a certain stage of the disease. The authors do not think that verruga occurs naturally in animals. The results of cultivation experiments did not give any support to the idea of a successful cultivation of the virus. In one experiment *in vitro*, however, there was a precipitate formed and what may have been a partial success was obtained on the inoculation of a monkey; if so, the virus was attenuated. The most satisfactory material is that secured directly from human cases. From the failure to find any microorganism in preparations from the lesions it would appear that the virus may prove to be a filterable one. The authors made experiments on this point but regard them as inconclusive. The similarity between the virus of verruga and that of small-pox is discussed.

Under the heading of Differential Diagnosis an experiment is described in which a Chilian volunteer was inoculated with verruga nodules from two patients. He contracted a modified form of the disease. No parasites were observed in his blood, and no anaemia developed. A portion of his lesion was inoculated into the testis of a rabbit, which developed a typical verruga lesion in that organ. This experiment clinches the proof that Oroya fever and verruga peruviana are distinct diseases.

In the account of the pathology the question of internal lesions is discussed. The authors have been able to show that some of these are lesions of tuberculosis. They have examined the pathological material at the hospital at Lima and were not convinced that any of the lesions they saw in the internal organs were of a verrugal nature. As to the histology the authors write:—"The verruga nodule constitutes a special form of granuloma characterized in the early stages by the formation of new blood-vessels in oedematous connective tissue, and by marked proliferation of the angioblastic cells forming masses or islands of closely placed cells, by the invasion of the connective tissue by lymphocytes, plasma-cells, and leucocytes, and as the lesion progresses, by the formation of fibroblasts and the deposit of collagen fibrils." There are several plates illustrating the histology.

In a short discussion on vaccination and immunity the authors express the opinion that by the use of virus passed through monkeys man may be vaccinated against the disease, or even possibly with virus obtained directly from human lesions. Animals so inoculated are immune for six months.

They go on to discuss Mr. C. H. T. TOWNSEND'S work on transmission by insects, giving quotations from his numerous writings. With regard to the dog to which he "transmitted" verruga [this *Bulletin*, Vol. 2, p. 621] the authors had the opportunity of seeing the "typical nodular eruption" and blood smears; the former "resembled in no way the lesions of verruga," in the latter "no bodies resembling the parasite of Oroya fever were observed." As regards Mr. TOWNSEND'S "Human Case of Verruga directly traceable to *Phlebotomus verrucarum*" [l. c. Vol. 4, p. 487] the eruption did not occur until over three months after the bites. The authors conclude:—

"Further experiments will probably show whether a species of *Phlebotomus* is the transmitting agent in Oroya fever. While we have some confidence in Mr. Townsend's entomological work, we feel from what we saw of his work during our stay in Peru that from a medical standpoint his observations need confirmation before they can be accepted."

They consider that transmission of verruga peruviana may be brought about by some arthropod or in a somewhat similar manner to small-pox.

Chapter 5 deals with Entomological Investigations at Matucana, a town at 7,300 feet, inland from Lima. In spite of the extremely dry environment the insect fauna, late in June, was by no means meagre. One species of mosquito was reared in large numbers from larvae in a tank; this is described as *Phalangomyia debilis* Dyar and Knab, n.g., n.sp., with figures. Larvae of *Simulium* were abundant; four distinct types of larvae or pupae are described. The character of *B. bacilliformis* suggests tick transmission but no ticks were found. TOWNSEND has described a tick from viscachas in and above the verruga zone. Lastly, there are phlebotomi.

Chapter 6 is on Uta. This disease has existed in Peru since prehistoric times. It has been attributed to syphilis, leprosy and lupus vulgaris. In certain towns a large proportion of the inhabitants either have the disease or show scars of it. The affection is described with photographs of patients. The face and neck are most commonly affected, and secondary infections may lead to great loss of tissue. The disease is due to a species of *Leishmania*, which is figured. The parasites are easy to find at first, but increasingly difficult as the disease progresses. The authors do not feel justified in creating a new species for the parasite, as others have proposed. They cultivated it and transmitted it by inoculation to the internal surfaces of the ears of a dog.

Chapter 7 is headed Guayaquil, Sanitary Conditions and prevailing Diseases. Like other tropical towns this is flat and only a few feet above the river (Guayas). The population is estimated at 80,000. The insanitary conditions of the streets are described. It is concluded that "Guayaquil, from a sanitary standpoint, compares unfavourably with most of the notably unhealthy cities of the world." Many very advanced cases of uncinariasis were seen. Yellow fever is common but there is great difficulty in its diagnosis as "about 95 per cent. of the population are said to suffer from malaria" and the diseases may both be present in one individual; they saw two such cases. *S. calopus* could be observed at almost any part of the city by day as well as by night, but "could hardly be considered as abundant." As has been observed before, "a large *Stegomyia* population is not necessary for the maintenance of a constant incidence of yellow fever in a community." Breeding opportunities are slightly curtailed by the health authorities. *Stegomyia* larvae were not found in the water in the streets, gutters and drains. Plague is even more common than yellow fever and is said to be spreading inland; it is very mild as compared with that seen in the East. Dysentery and typhoid also prevail. Anophelines, almost absent in the dry season, are very common in the wet.

Chapter 8 treats of yellow fever, Chapter 9 of a Linguatulida found in the lung of a crocodile, *C. americanus*. It is figured and considered to be a new species, *Porocephalus crocodili*.

In an appendix the new linguatulid is described by W. M. WHEELER. C. T. BRUES writes a note on some flies of the family Phoridae. On agar melium inoculated with scrapings from the skin of a negro affected with carate dipterous larvae were found a few days later, and eventually adult flies were obtained of two species of *Aphiochaeta*. A species in India has been found to cause myiasis of the intestine and the larvae have been extracted from an Indian's foot in Honduras. F. KNAB contributes notes on Peruvian Mosquitoes and Mosquito Literature, and gives an annotated list of the mosquitoes now known to occur in Peru. A short paper on Heteroptera and a list of bees conclude the Report.

The authors may be congratulated on both the excellence of their work and its presentation. It is to be hoped that the mode of transmission of Oroya fever and verruga may be soon demonstrated, as a basis of a sound prophylaxis.

A. G. B.

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## TROPICAL DISEASES BUREAU.

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## KALA AZAR.

YAKIMOFF (W. L.). *Contribution à l'étude des Leishmanioses de l'homme et du chien dans le Turkestan russe.*—*Bull. Soc. Path. Exot.* 1915. July. Vol. 8. No. 7. pp. 474-503.

This is a long paper on leishmaniasis in Russian Turkestan, a subject upon which the author has been conducting investigations for some time. He has reported his results from time to time and in the present memoir he gives a complete review of the progress so far made.

The author has diagnosed thirty-one cases of kala azar in Turkestan. The limits of the region in which the cases occurred are Andijan, Askhabad, Tashkent and Termese. In this area there exist endemic centres such as the towns of Tashkent, Bokhara and Samarcand. Cases occur, however, further afield, as the one recorded by KALATSCHNIKOFF from the Tobolsk district, while the country north of Khiva, the provinces of the Steppes and Semiretchinsk are also probably involved.

As regards the age of those infected, the clinical features of the disease, and the frequent association of canine cases, the kala azar of Turkestan is not to be distinguished from the diseases of India and the Mediterranean littoral. The leishmania themselves are identical with those from kala azar cases elsewhere. A point worthy of note is the author's claim to have demonstrated reproduction of leishmania by schizogony. The masses of cytoplasm containing varying numbers of nuclear pairs which were first described by LAVERAN and MESNIL as "*ganques*" have been variously interpreted as detached portions of the cytoplasm of large mononuclear cells containing parasites, reproductive phases of the parasites, or degenerative appearances. The author now states that in one and the same preparation he has been able to trace the whole development of these bodies, which first commence with one nuclear pair; the nuclei multiply till a multinucleate body is produced and this segments into a corresponding number of leishmania.

A number of animal inoculations have been made. A mouse was infected from the spleen of a child and from this other mice. The strain was then passed through two dogs, while two cats were inoculated from a mouse, but whether the cats became infected or not is difficult to gather from the description.

The author believes that the human and canine diseases of Turkestan are identical. The disease in dogs is frequently very difficult to recognise. It is the author's experience that over 90 per cent. of infected dogs show no outward sign of disease. Post mortem the most characteristic signs are enlargement of the spleen associated with a red colour of the bone marrow.

The remarks upon oriental sore in Turkestan are chiefly those which appeared in a former publication [this *Bulletin*, Vol. 6, p. 225]. The view is expressed that, in Turkestan at least, the parasite of oriental sore is identical with that of kala azar and that the differences of the two diseases depend upon the varying resistance of those infected. The leishmania in oriental sore were first described by BOROWSKY in 1898. His description, which unfortunately appeared only in Russian, contains certain errors, but a reference to his remarks and the figures illustrating his article leave no doubt that he was the first to recognise as the cause of the disease the bodies which were later more accurately described by WRIGHT and MARZINOWSKY.

C. M. Wenyon.

SPAGNOLIO (Giuseppe) **Die Leishmaniose bei Menschen und Hunden. Studium des Krankheitsgebietes.** [Leishmaniasis in Man and Dog. Study of an Infected Region.] - *Cent. f. Bakt.* 1. Abt. Orig. 1915. Jan. 15. Vol. 75. No. 4. pp. 294-298.

As a result of observations on human and canine leishmaniasis in and around Palermo, the author has come to the conclusion that the disease in children is more widely distributed in the flat country round the towns than in the towns themselves, though here the people live crowded together like ants in an anthill. Furthermore, there does not seem to be any direct relationship between the disease in dogs and the disease in human beings, for only in a few cases have dogs been kept in the houses of the kala azar cases studied by him. Many observers have shown that leishmaniasis in both children and dogs is most common in the spring and that the cases become less frequent later in the year. If the flea is the carrier of the infection, it is strange that the greatest incidence of the disease occurs in those months in which the flea is least active. Many other arguments against the flea hypothesis are raised by the author, all of which turn on the fact that cases of kala azar do not appear in summer when the fleas are feeding most actively. In no instance of the disease studied by the author has there been evidence of direct infection from one case to another. In the few cases of infection in adults it is always the man who contracts the disease though the wife, a much heavier flea carrier, invariably escapes. In families with several children there is rarely simultaneous infection, which should be the case if the flea was the carrier. A second case in a family usually occurs one or two years after the death of a first case. For these reasons and others enunciated by the author he comes to the conclusion that the human and dog flea are not responsible for the transmission of kala azar.

C. M. W.

da SILVA (Pereira). **Expériences sur la Transmission de la Leishmaniose Infantile par les Puces** (*Pulex irritans*).—*Archiv. d. Inst. Bact. Camara Pestana*. 1915. Vol. 4. No. 3. pp. 261-267.

The part played by fleas (*Ctenocephalus canis* and *Pulex irritans*) in the transmission of human and canine kala azar has not yet been definitely proved. Positive results are claimed by BASILE, SANGIORGI, and SERGENT and his co-workers, while negative results only were obtained by GABBI, MARSAGLIA, MARSHALL, WENYON, PEREIRA da SILVA, PATTON and others. BASILE attributes this failure to the fact that the experiments had not been conducted at the optimum temperature of 18° to 30° C., especially at 22° C.

Former experiments by the author were made by attempting to feed fleas on experimentally infected dogs. The negative results in this case might possibly be due to the infection in the dog being merely an experimental one. Accordingly the author decided to repeat the experiment on a natural infection in a child. Fleas (*Pulex irritans*) were caught and fixed on wire by NÖLLER's method. They were then fed upon a healthy individual and their faeces carefully examined for a natural flagellate infection. Twenty-five fleas free from infection were selected and these were allowed to feed on a child suffering from advanced kala azar. The fleas were kept at a temperature of 22° C. in an incubator. The details of the feeds and the time elapsing before the fleas were finally examined are set forth in a table. The 25 fleas fed in all 484 times. The faeces passed by the fleas during the act of feeding were examined for flagellate infection, so that if any flagellate infection of the gut had resulted from one of the previous feeds it should have been detected. In no case was there any evidence of such an infection. The 25 fleas with their 484 feeds gave uniformly negative results, none of the fleas having become infected with flagellates from any leishmania which might have been taken up in the blood of the child. In consequence of these results and the work of others the author feels obliged to conclude that fleas are not the agents of transmission of human and canine kala azar.

C. M. W.

WENYON (C. M.) **Leishmania Problems: Observations on a Recent Contribution to the Subject.**—*Jl. Trop. Med. & Hyg.* 1915. Nov. 1. Vol. 18. No. 21. pp. 241-247.

FANTHAM (H. B.) **Herpetomonads and Vertebrates: A Correction of a Recent Contribution on "Leishmania Problems."**—*Ibid.* Dec. 15. No. 24. pp. 277-281.

These two papers are of a controversial nature and add nothing to our knowledge of the subjects under discussion.

C. M. W.

MACKIE (F. Percival). **The Presence of Leishmania in the Peripheral Blood of Cases of Kala-Azar in Assam.**—*Indian Jl. Med. Research.* 1915. July. Vol. 3. No. 1. pp. 90-92. With 1 coloured plate.

During the last two years the peripheral blood of 245 cases of kala azar has been examined for leishmania. The cases had not all

been diagnosed by spleen or liver puncture though every doubtful case was excluded. However, some cases other than kala azar had probably been included, so that the figures in reality are lower than they should be. In the majority of cases only a single blood examination was made, but a good many were examined frequently, with the resulting discovery that leishmania might be found on one occasion though not on others. Thus in one case 28 blood examinations were made over a period of six months and of these 27 were negative, while the one positive examination showed only three leishmania, in one cell. Another case of undoubted kala azar diagnosed by spleen puncture was examined on eighteen occasions with negative result every time, though the patient was in an advanced stage of the disease.

The author writes that contrary to the experience of some observers he has not found peripheral blood infections especially associated with complications such as dysentery, nor has he found them more common in the terminal stages of the disease.

The author's conclusions are as follows :—

"1. The proportion of peripheral leishmania infections varied considerably, being 21 per cent. amongst a series of indigenous Assamese and nearly 64 per cent. amongst a series of tea garden coolies.

"2. The frequency of peripheral infections was approximately equal at all stages of the disease.

"3. Cells of the large mononuclear type were most commonly infected and multiple infections of a single cell were very frequent."

C. M. W.

WELD (A. E.). **A Short Note on the Work done in the Military Families Hospital, Malta, during the Period from January 1909 to August 1914.**—*Jl. R. Army Med. Corps.* 1915. June. Vol. 24. No. 6. pp. 579-584.

During the period of 5 to 6 years seventeen cases of kala azar were treated in the hospital. Of these cases one has recovered, as he is still healthy four years after discharge, another case a year after discharge is improving, while the rest died. Fourteen cases had injections of salvarsan. In only one case was there even a reasonable possibility that the child had been directly infected by a dog. The youngest case was four months old. In all these cases the parasite was found in the smears of the spleen, liver or bone marrow.

C. M. W.

SPAGNOLIO (Giuseppe). **Vizio cardiaco e leishmaniosi interna.** [*Morbus cordis and Kala Azar.*]—*Malaria e Malat. d. Paesi Caldi.* 1915. July-Aug. Vol. 6. No. 4. pp. 191-192. With 1 text fig.

The paper gives an account of a case of kala azar in a boy, which is interesting from two points of view, namely, the age of the child, which is ten years and considerably above the average for such cases in Italy, and the fact that there was a complication in the shape of mitral disease of the heart.

C. M. W.

TRANTAS (A.). ΤΡΑΝΤΑΣ (Α.) Σημειώσεις οφθαλμολογικά. II. 'Αλλοιώσεις οφθαλμοσκοπικά κατά την γενικήν λεισμανίασιν. [Ophthalmological Observations. II. Ophthalmoscopic Changes in Generalised Leishmaniasis.]—, 'Αρχαία Ιατρική. (Arch. de Méd.). 1915. Dec. 1-20. Vol. 10. No. 34-36. pp. 276-279.

Ophthalmoscopic observations on two patients suffering from systemic kala azar.

Case I. Man, aged 26 years. Had suffered from symptoms of kala azar for six months, and had been treated in hospital with benefit, amongst other things with eight injections of salvarsan. A blood examination showed red cells, 2,136,000 per cmm.; leucocytes 2,600; haemoglobin content 50 per cent. of the normal. The eyes were examined upon the patient's exit from hospital with the following result.

*Right eye.* A haemorrhage in the lower half of the retina, 6-7 mm. in diameter, round and with irregular borders. The optic papilla was much altered in appearance, dark and its edge only discernable on the temporal side, possibly from staining with effused blood. The arteries were moderately dilated, as were the veins. Slight loss of pigmentation of the choroid towards the periphery.

*Left eye.* The same discoloration of the optic papilla, but in less degree. The edge of the papilla only to be made out on the outer side. Superiorly, at the edge of the disc, a red spot looking like a haemorrhage, but disappearing when the eyeball was pressed with the finger during the ophthalmoscopic examination; therefore, probably only a dilated vessel. Retinal vessels, moderately full. Towards the periphery of the field, loss of choroidal pigment, so as to produce white patches. Vision normal. A second blood examination, made immediately after the ophthalmoscopic examination, showed red cells 2,800,000 per cmm.; leucocytes 4,200; haemoglobin '34 of the normal.

Case II. A boy, aged 11 years. General symptoms much as in preceding case. Red cells, 3,369,000 per cmm.; leucocytes, 3,000; haemoglobin 40 per cent. Treatment with arsenic and iron, followed by injections of emetin, but no salvarsan. Ophthalmoscopic examination: no haemorrhages in either eye, or alteration of the papilla, but much patchy pigmentation of the retina with, in parts, choroidal atrophy. No history of congenital specific disease. [Vision not noted; therefore presumably normal.]

In both these cases the parasite of kala azar had been duly found, so that there could be no doubt about the diagnosis. The author thinks that further investigations in this direction are worth making.

J. B. Nias.

MACKIE (Percival). Tartar Emetic in Kala-Azar.—*Brit. Med. Jl.* 1915. Nov. 20. p. 745.

The paper gives a description of two cases of leishmania infection treated by injections of tartar emetic. The first was an officer who had a leishmania infection of the lip, which commenced in a deep fissure in the mucous membrane caused by the cold dry wind. The lesion increased rapidly in size till it was as large as a pigeon's egg. He also had a cyst-like swelling deep in the cheek, which had no visible communication with either the mucous or skin surfaces. This was punctured and yielded leishmania in pure culture, while the exudate from the lip also showed these parasites together with *Staphylococcus albus*. Intravenous injections of tartar emetic were given at intervals of two or three days till six doses had been administered. On each occasion the dose was 4 to 6 cc. of a 1 per cent. solution in normal saline. The treatment was very successful so far as the cutaneous



and subcutaneous part of the disease was concerned, but the mucous ulceration was more difficult to cure and healed only after several applications of carbon dioxide snow.

The second case was one of acute kala azar with persistent high temperature, irritable heart, darkening of the skin and rapid emaciation. The spleen enlarged very rapidly and puncture yielded leishmania in active multiplication. He received intravenous injections of antimony tartrate on alternate days. The dose was at first 4 cc. of a 1 per cent. solution and this was gradually increased to 7.5 cc. The treatment extended from May 23 to June 10. The temperature rose after the first two injections and then fell rapidly to normal, while the spleen began to recede and the general symptoms abate.

The author writes that in two and a half years' experience of kala azar he has seen no such promising result from any drug or any line of treatment. The author left for Europe and has not heard of the patient since.

C. M. W.

DI CRISTINA (G.) & CARONIA (G.). *Ueber die Therapie der inneren Leishmaniosis.*—*Deut. Arch. f. Klin. Med.* 1915. Vol. 117. pp. 263-277.

This paper has already been published in other languages and has been reviewed in the *Bulletin*, Vol. 5, p. 269. In this edition, however, there is added to the eight already described an account of three further cases of infantile kala azar treated by intravenous injection of tartar emetic. In one of these the injections extended over 10 days, the child receiving in all 0.185 gram of the drug. The second case was treated for 17 days and received 0.27 gram, while the third was treated for 10 days and received also 0.27 gram. The first case is cured, the second is improving, while the third died of broncho-pneumonia.

C. M. W.

KOKORIS (D.). *Ueber die Splenektomie bei Kala-Azar.*—*München. Med. Woch.* 1915. July 27. Vol. 62. No. 30. pp. 1008-1009.

A record of three cases of infantile kala azar in Grecian children 3½, 3 and 5 years of age. Diagnosis was made by the finding of leishmania on spleen puncture and the treatment adopted was removal of the spleen. The first child still continued to have fever and died four months after the operation; the second child improved temporarily, but later the fever returned and it was removed from hospital by its parents two months after the operation; the third child improved rapidly and has remained perfectly well for over three years. This is the first case of known kala azar in which treatment by splenectomy was followed by recovery.

C. M. W.

COCHRAN (Samuel). *Splenectomy in Kala-Azar. (Preliminary Report.)*—*China Med. J.* 1915. Sept. Vol. 29. No. 5. pp. 301-307. With 3 charts.

The paper gives a description of three cases of kala azar treated by splenectomy. The technique of the operation was in the main that suggested by MAXWELL in the March number of the *China Medical*

*Journal* and, owing to the tendency of kala azar cases to bleed, haemorrhage was forestalled by the transfusion of 50-60 cc. healthy blood. The ages of the patients were 20, 10 and 22 years. All three cases showed an immediate and marked increase in haemoglobin and the leucopenia was abolished, there being a tendency to leucocytosis. One case survived only seventeen days. The other cases were at the time of writing in considerably better health than before the operation. In one the liver has shrunk to normal size. Both patients have increased in weight and their temperature curves are more nearly normal than before the operation. Parasites, however, are still easily found, though in one case in smaller numbers. The author admits that it is too soon to speak of the final results and conclusions, but in these cases the effects of the operation have been sufficiently interesting to make it worth while to report them.

C. M. W.

WENYON (C. M.). **Flagellate Forms of *Leishmania donovani* in the Tissues of an Experimentally Infected Dog.**—*Jl. Trop. Med. & Hyg.* 1915. Oct. 1. Vol. 18. No. 19. pp. 218-219.

Although in Italy and South America flagellated or leptomonas forms of leishmania have been found in smears from cases of dermal leishmaniasis, the author records the first occasion on which such forms have been demonstrated as existing in the tissues in kala azar.

In September 1913 he inoculated a dog with spleen emulsion from a patient dead of kala azar contracted in Calcutta. Infection resulted and the strain has been kept going by sub-inoculation in dogs, five passages in all having been performed. On July 29th, 1915, a young dog was inoculated intraperitoneally with spleen emulsion from a dog of the fourth passage. By Sept. 4th this young dog, which had become infected, was obviously in a dying condition, so it was killed and examined immediately after death.

In smears of the bone-marrow, flagellate leptomonas forms were found, resembling those which develop in N.N.N. medium. These are illustrated, one of the parasites shown being in the process of longitudinal division. Ordinary forms of leishmania were also present and, as is usual in dogs, they exhibited a much greater variety in form and size than they do in man.

Incidentally Wenyon notes that YAKIMOFF and SCHOKHOR are scarcely justified in separating the *L. tropica* of Turkestan into several varieties merely on account of this variation in size. He has noted the same feature in natural canine kala azar in Malta.

A. Balfour.

YAKIMOFF (W. L.). **De la période d'incubation chez les animaux infectés par les *Leishmania*.**—*Bull. Soc. Path. Exot.* 1915. July. Vol. 8. No. 7. pp. 430-431.

The author notes that the incubation period of kala azar in experimental animals may be very short. In one case a mouse inoculated intraperitoneally from the organs of a dog showed leishmania in its organs 6-7 days later. In another case a rat was inoculated intraperitoneally with emulsion of the organs of a mouse in which leishmania could not be found microscopically, but which gave a

positive culture in N.N.N. medium. The rat died next day and its liver contained an enormous number of leishmania. In the case of dogs NICOLLE demonstrated parasites 12-13 days after inoculation.

[When the author speaks of an incubation period of an infection it is rather difficult to follow exactly what he means. When leishmania are injected directly into the peritoneum it is clearly possible to find leishmania there immediately after, and by killing and examining the animals soon after a heavy injection the incubation period would be reduced to nil. In such cases the animals are certainly infected from the moment of inoculation. In the case of more virulent parasites, such as trypanosomes, a small injection may ultimately give rise to a large and fatal infection, but in these cases also the infection must have existed from the moment of introduction of the parasites into the animal.]

C. M. W.

LAVERAN (A.). *Sur une culture de Leishmania donovani souillée par un champignon.*—*Bull. Soc. Path. Exot.* 1915. July. Vol. 8. No. 7. p. 429.

Cultures of *L. donovani* were contaminated by a fungus which grew luxuriantly in the tubes. The leishmania, however, were not destroyed and continued in good culture. In order to get rid of the fungus, into each tube were introduced five drops of a 1 per cent. caustic soda solution; four days later the tufts of fungus had disappeared and subculture yielded pure cultures of *L. donovani*.

C. M. W.

#### TROPICAL SORE.

LAVERAN (A.). *Comment le bouton d'Orient se propage-t-il?*—*Ann. Inst. Pasteur.* 1915. Sept. Vol. 29. No. 9. pp. 415-439.

This paper is an interesting summary of observations and experiments on the subject of the transmission of oriental sore. In the first section the author names the several observers who have transmitted the disease from one person to another by inoculation of material from the sore, while in the second section he quotes a long list of writers who have published evidence that the disease may be acquired accidentally by a person coming into close contact with one who is already infected. The third section of the paper is devoted to the question of insect transmission and the author summarises the experiments that have been made in this direction. The question of the mechanical transmission of the disease by means of house-flies is discussed and the author describes some experiments of his own which were conducted to test this possibility. Three flies, which had been allowed to feed upon crushed tissue containing leishmania, were taken 30 minutes later and drawn across slides in such a manner that the ends of the legs and proboscis were brought in contact with the slide. The slides were then fixed and stained and in two of them leishmania were discovered. It is thus demonstrated that under certain conditions house-flies are able to carry leishmania mechanically and might in this way infect open sores and wounds. A fourth section is devoted to a discussion of the question of a possible reservoir.

C. M. W.

GACHET. **Thérapeutique spécifique et prophylaxie du bouton d'Orient.**  
—*Bull. Acad. Med.* 1915. 3 ser. Ann. 79. Vol. 73. No. 16.  
pp. 475-481.

The author, working in Teheran, Persia, where oriental sore is very common, has had good results by treating cases with intravenous injections of arsenobenzol. As a rule only one injection is necessary, but sometimes two are required to bring about a cure, which is complete in three to five weeks. The dose used is 1 centigram of neo-arsenobenzol per kilo of body weight and very distinct improvement is to be observed during the first week. Ten cases have been treated in this manner with success.

Attempts have been made to treat the sores by local application of arsenious acid, neo-arsenobenzol, arrhenal, atoxyl and hectine. Though improvement has resulted from this method, the results have not been permanent. The leishmania cannot be brought completely under the influence of the drug in purely local treatment. Much better results have been obtained by injecting hectine into the tissue round the sore. It is employed in solution, 0.1 to 0.2 gram being dissolved in 1 cc. of water. Injections are made twice a week and for an adult the dose is 0.2 gram. For children the dose is reduced to 0.01 gram per kilo of body weight. As a result of this line of treatment it is seen that a case treated before ulceration has set in recovers without any trace of the lesion. When ulceration has commenced the process is at once arrested and healing with a scar is rapidly accomplished. In severe cases the advantage is still greater, for deformities of the nose, ear and eyes, which often result if the cases are left to run their own course, are completely prevented.

Oriental sore, known as *sulek* in Persia, is very common in dogs which wander about the streets. The animals can be readily treated and cured by the intramuscular injection of 15 milligrams of neo-arsenobenzol per kilo of body weight. A second injection is given eight days later and sometimes a third. Healing of the sores takes place in three to five weeks. The animals suffer very little from the injections; one hound receiving an injection in the morning took part in a hunt in the afternoon.

The author makes the statement that the human sore is easily inoculable to man and that the canine one is easily inoculable to dogs, other animals and men. He does not explain if this statement is based on experimental proof. Though the disease is so readily transferred by direct inoculation, there is very little evidence in favour of this being the method of acquiring the disease in nature. Frequently one sees an infected child living for nine months amongst its brothers and sisters who completely escape infection. A woman who was nursing her child, aged fourteen months, had not suffered from the disease and did not contract it from the child, which had a large ulcerating sore on the lower lip.

As regards the agent of transmission the author suggests the dog fly, *Hippobosca canina*, which is always found on the dogs. Flies taken off infected dogs are found to harbour in the thorax and abdomen bodies which the author considers to be leishmania taken up from the dog. It would be easy, he suggests, for these flies directly to transfer leishmania which are adhering to the proboscis, either on its outer or

inner surface. Two assistants, who were helping the author to catch flies off dogs, were bitten on the arm by these flies. In the one case a sore developed at the wound inflicted by the fly, while in the other a papule alone developed and disappeared in a few days.

Prophylactic measures should be directed against the two sources of infection—man and dog. Both can be cured by suitable treatment and the latter, if numerous in the streets, can be destroyed. Some steps towards the extermination of the street dogs in Teheran have been undertaken by the police, who will have thus contributed largely to the eradication of *salek* from its population.

C. M. W.

Low (George C.). **A Case of Oriental Sore treated by Antimonium Tartaratum (Tartar Emetic) locally.**—*Jl. Trop. Med. & Hyg.* 1915. Nov. 15. Vol. 18. No. 22. pp. 258-260.

The writer of this paper records the successful treatment of a case of oriental sore by means of an ointment containing antimonium tartaratum. The disease had been contracted in Lahore in the Punjab and had lasted fifteen months when the case came under the author's notice. There were two sores on the face, which were healing, and one on the finger, which was ulcerated and oozing pus. Films and cultures were made from one sore on the face and from the finger by Dr. WENYON. Leishmania were not found in the films but flagellates were grown from both sores in the cultures. After three weeks' observation and treatment by salicylic ointment the sore on the finger appeared to be extending and leishmania were found. Accordingly methylene blue ointment (methylene blue, lanolin, vaselin, equal parts) was applied at nights. After a fortnight of this treatment the finger was much worse, so the methylene blue treatment was stopped and after a few days' rest treatment with a 2 per cent. antimony tartrate ointment was commenced. This was applied night and morning to the finger sore and was well borne by the patient for a fortnight, when it was given up owing to the sore becoming painful. The finger sore improved considerably after this and all inflammation was gone in a fortnight and after another two weeks healing was practically complete. With this improvement a thickening of the lymphatic cord in the arm, which had been a marked feature of the case, disappeared entirely. The author was led to adopt the antimony tartrate treatment owing to the successful results obtained by physicians in South America in the treatment of cutaneous leishmaniasis by means of intravenous injections of the drug. He justly remarks that if the local application of the drug, as used by him, should be generally successful, then this method of treatment would be preferable to the intravenous injections.

C. M. W.

LAVERAN (A.). **Nouvelle contribution à l'étude des infections expérimentales de la souris par la *Leishmania tropica*: un cas d'infection de la gerbille.**—*Bull. Soc. Path. Exot.* 1915. Nov. 10. Vol. 8. No. 9. pp. 680-686.

In this paper the author describes further experiments on mice with the parasites of oriental sore and kala azar. In the case of *Leishmania*

*tropica* the mice inoculated intraperitoneally ultimately develop cutaneous lesions, testicular tumours, oedematous swellings of the feet or infiltration of the periarticular tissues. In these various lesions the parasites occur in enormous numbers. When an infection of the visceral organs occurs it is slight and seems to be of a secondary nature. The parasite of kala azar on the other hand behaves in a different manner, for in 47 infections of mice the parasites have been localised in the internal organs and have never given rise to lesions like those seen in mice suffering from *L. tropica* infection. Mice infected with *L. tropica* frequently die, but cases of recovery have been noted by the author. The gerbil inoculated with the parasite of oriental sore reacts in a similar manner.

Mice fed on tissue containing *L. tropica* did not become infected. An attempt was made to transmit infection by means of fleas. Four healthy mice were placed with other infected mice in a flea-breeding jar. Three of the mice were killed after five months' sojourn in the jar and were found free from infection. The fourth mouse remained there eight months. It was then removed and cleared of all its fleas. It has continued to live since then in perfect health.

C. M. W.

LAVERAN (A.). *Leishmaniose américaine de la peau et des muqueuses.*—*Bull. Soc. Path. Exot.* 1915. May. Vol. 8. No. 5. pp. 284–301; June. No. 6. pp. 382–397.

A complete account of the literature relating to the dermal and mucosal leishmaniasis of America, which should be consulted by all who wish to have a reliable and up-to-date knowledge of the disease.

C. M. W.

BOLETIM DA SOCIEDADE BRASILEIRA DE DERMATOLOGIA. 1914. Vol 3. Nos. 1–2–3.

This number contains brief notes on various cases of dermal leishmaniasis in S. America. RABELLO mentions a case in a man aged 34, in whom the disease took the form of papillomatous growths from the lips and margins of the nares. Other growths of a similar nature occurred on the upper and lower extremities. MACHADO describes a case which is interesting from the point of view of the extreme age of the victim, who was sixty-four. CARVALHO records a case treated by intravenous injections of tartar emetic. There was at first improvement but at the sixth injection the lesions appeared to increase in size; finally, however, the tartar emetic gave a marvellous result. The man also received intravenous injections of "914" and this had helped to bring about the cure, as the leishmaniasis was implanted on an old syphilitic infection. D'UTRA e SILVA describes the successful inoculation of a dog from one of these cases.

C. M. W.

da MATTA (Alfredo A.). **Subsídio para o estudo da physionomia clínica, classificação e synonymias das leishmanioses na America do Sul.** [A Contribution to the Study of the Leishmaniasis of South America.]—*Brazil Med.* 1915. Sept. 8. Vol. 29. No. 34. pp. 265–268. With 1 fig.

A paper on the different forms of leishmaniasis met with in South America, giving a complete tabular classification at the end, too long to reproduce here on account of the number of synonyms. From this table the following particulars may be taken :—

1. The visceral forms of leishmaniasis, due to *L. donovani* and *L. infantum*, are not met with in South America.

2. The Leishman's nodules, met with in Egypt and due to *L. nilotica* (Brumpt) also do not occur.

3. The Oriental button, caused by *L. furunculosa* (Firth) has been recognised in Brazil by MOREIRA.

4. *L. braziliensis* causes a great number of forms of ulceration known by various names in different parts of the continent, and therefore leading to great confusion. Of these local names two, *bouba* and *espundia*, are applied indifferently by the laity both to leishmaniasis and to yaws, and therefore should be dropped scientifically. In the Amazon district a spongy ulceration of the skin, termed for that reason *esponja* or sponge, is due to *L. braziliensis* (CHAGAS); but there is also an excavating form of this ulcer, which goes by the name of *ferida brava*, or angry sore, which clinically has a very different appearance. An illustration is given by the author of this phagedenic form. Buccal leishmaniasis is another form, clinically very distinct, but due to the same parasite, and for this the indigenous name is *uta*. It can always be distinguished from syphilitic ulceration by the fact that it completely respects the bones of the nose.

J. B. N.

RODRÍGUEZ ARJONA (Vicente). **Contribución al estudio de las enfermedades de tierra caliente. Leishmaniosis cutánea en los niños de la región oriental de Yucatan.** [Cutaneous Leishmaniasis in Children in the Eastern Region of Yucatan. A Contribution to the Study of Tropical Disease.]—*Rev. Med. de Yucatan.* 1915. Apr.-May. Vol. 10. Nos. 6–7. pp. 101–106.

A note on the frequency of cutaneous leishmaniasis in Eastern Yucatan, especially on the lobes of the ears. SEIDELIN has already reported the disease from this region as occurring in the gatherers of chewing gum [see this *Bulletin*, Vol. 1, p. 13]. The author finds that the best treatment is the application of powdered permanganate of potash to the ulcers so as to form a scab, which must be allowed to drop off of itself.

J. B. N.

## PROTOZOOLOGY.

FANTHAM (H. B.) & PORTER (Annie). **Some Experimental Researches on Induced Herpetomoniasis in Birds.**—*Ann. Trop. Med. & Parasit.* 1915. Dec. 30. Vol. 9. No. 4. pp. 513 558. With 1 plate.

In continuation of their work on the introduction of insect flagellates into vertebrates [see this *Bulletin*, Vol. 5, p. 280, and Vol. 6, p. 181] the authors have tested the pathogenicity of certain insect flagellates with respect to birds. They note that in 1907 Ed. and Et. SERGENT in Algeria found and figured a herpetomonad occurring naturally in the blood of a pigeon\*. Moreover, numbers of birds die annually from unknown causes, amongst which, they suggest, may be included herpetomoniasis. The birds used were canaries, sparrows and martins. After being carefully examined for ectoparasites and for haematozoa, in each case negatively, they were fed either with the entire insects or with their alimentary canals. *Herpetomonas jaculum*, having been found capable of infecting fish, amphibia, snakes, and mice, was used and *H. culicis*, because many *Culex* were found in the crops of sparrows and martins that were found dead and sent for examination. Eight experiments are then detailed.

In one instance a canary was fed on the intestines of two *Nepa cinerea* containing *H. jaculum* and also on two infected nymphs. It died 51 days later. Twenty-one days from the commencement a blood smear showed the presence of post-flagellate forms of *H. jaculum*. Its state of health at various dates is given; it lost more than half its weight. After death smears of the organs showed leishmaniform bodies in the liver, spleen, heart, lungs, kidneys and bone marrow, a few flagellate herpetomonads in the liver, and in the lungs developing forms. Uninucleate forms were also found. In another experiment a number of *Culex pipiens*, which is known to harbour *H. culicis*, were fed to a sparrow which died on the ninth day. Smears made of the organs at death showed a generalised infection with *H. culicis*; the flagellate form predominated. The heart, liver, lungs, kidneys and suprarenals contained well-developed flagellates and a few leishmaniform bodies. In each case the control birds remained well. The flagellates of the insect hosts rarely co-existed with many bacteria.

The authors go on to consider the morphology of the parasites in the insect and the avian hosts. Figures illustrate the descriptions. When the infection was of a chronic type, non-flagellated leishmaniform bodies predominated, while the mature flagellates were more numerous when the infection was acute. The parasites were much more numerous in the internal organs than in the circulating blood, a feature common in kala azar.

They then give the details of the discovery of the brothers SERGENT. The source of their herpetomonad is not known with certainty, but may have been flagellates, in the Dipteran *Lynchia maura*, infesting the pigeons. They draw attention to the resemblance in the accounts of this "presumed natural herpetomoniasis of the pigeon and the induced herpetomoniasis in our birds." "The same parallel holds in the case of the natural and induced herpetomoniasis of mice recently described by us [this *Bulletin*, loc. cit. and Vol. 6, p. 183].

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\**Ann. Inst. Pasteur*, Vol. 21, p. 270.



These parallel conditions suggest that these diseases induced by natural flagellates of invertebrates will, sooner or later, be found in parallel under conditions not those of the laboratory."

They next discuss the flagellate stage in herpeticomoniasis and in leishmaniasis. The flagellate form of *Leishmania tropica* in man has been known for some time [ESCOMEL, LA CAVA, SPLENDORE, MONGE]. Recently WENYON has found the flagellate stage of *L. donovani* in a dog [see page 81]. This, they think, completes the evidence that the parasites of the leishmaniasis are really herpeticomonads. They note that it is not always easy to find flagellate forms of the various herpeticomonads used owing to their fragility and rapid disintegration after death of the host. Their general conclusions are as follows:—

"Under suitable conditions, insect flagellates can be introduced into vertebrate hosts and produce infection therein. In some cases, as in cold-blooded vertebrates, little obvious ill-effect results; in others, as in mammals and birds, disease is manifested and often ends in death. Similar infections are known to occur naturally in some cases, for example, in mice and pigeons.

"The organisms, such as herpeticomonads, thus introduced, retain their powers of development on the same lines as when they were present in the insects. The morphological cycle of *Leishmania* is like that of *Herpeticomonas*. The various species of *Leishmania* are probably insect herpeticomonads long since introduced into man and usually perpetuating the non-flagellate, relatively more resistant form, though capable of assuming the flagellate, herpeticomonad facies in the internal organs of the vertebrate or in the invertebrate host.

"Various vertebrates—fish, amphibia, reptiles, birds and mammals—may serve as reservoirs of leishmaniasis. The virus may be very attenuated and so escape detection, or only be revealed by the presence of the flagellate forms in cultures. It has also been suggested by Stephens (1915) that each case of leishmaniasis in vertebrates arises *de novo* from the introduction of insect flagellates.

"No insect flagellate can be considered to be quite innocuous to vertebrates until it has been put to the test.

"Leishmaniasis, which is a form of herpeticomoniasis (leptomoniasis), is a flagellosis, as is also trypanosomiasis. Treatment of leishmaniasis by intravenous injections of tartar emetic, as advocated and practised recently by Vianna, Carini, di Cristina and Caronia, Rogers and others, is sound biologically, as drugs containing arsenic or antimony have proved efficacious in trypanosomiasis. It is thus seen that the researches of the comparative morphologist are of the greatest possible assistance to the medical man when founding a basis for therapeutics."

A summary of the paper follows.

A. G. B.

LYNCH (Kenneth M.). **Trichomoniasis of the Vagina and the Mouth. Cultivation of the Causative Organism and Experimental Infection. (A Preliminary Communication.)**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1915. Apr. Vol. 2. No. 10. pp. 627–634.

The author briefly reviews previous work on *Trichomonas vaginalis* Donné. He seems to favour the view that trichomonads found in the vagina, urethra, mouth, lungs and alimentary tract are one and the same organism, and that trichomonads may further excite already existing inflammatory conditions. He gives the history of a case of infection of the vagina and gums.

The patient examined was a young negro woman at Charleston, South Carolina. The woman came into hospital suffering from pellagra. She also had acute gingivitis, and so was referred to the author for examination for *Endamoeba buccalis*. There was no diarrhoea, but there was a catarrhal vaginal discharge, which was said to have commenced two months previously. The patient had also a slight cough, bringing up at times blood-tinged mucus. *Endamoeba buccalis* was found in the blood-stained scrapings from the gums and, in addition, large numbers of active flagellate trichomonads. These flagellates had "four flagella coming from the anterior end and frequently the attachment of these flagella to little knob-like blepharoplasts could be made out. . . . There was no distinct cytostome but a flat or depressed cell wall extending for the anterior half of the length of the body. . . . In addition to the flagella, there was a definite undulating membrane passing with decreasing sized waves from the base of the flagella." The nucleus was very indistinct. The posterior end tapered.

The average size of the organisms was about  $22\mu$  by  $26\mu$ . A few parasites from the vagina were larger than this. No dividing forms and no cysts were obtained from the patient. Similar organisms were obtained from the vaginal discharge. There were no animal parasites in the patient's faeces.

The trichomonads were successfully cultivated in acidified bouillon at  $30^{\circ}$  C. Multiplication occurred in the cultures for about three days, when the associated bacteria prevented further development. Some subcultures were obtained. The contents of one culture tube were injected into the rectum of a white rabbit, which, in three days, was passing soft brown stools containing many trichomonads which were not previously present.

The treatment consisted of "a vaginal douche of saturated solution of bicarbonate of soda . . . given twice daily and the same solution was used to thoroughly cleanse the mouth and gums three times a day." There was marked improvement after three days. The remaining amoebae were then treated with emetine.

The author gives a full summary of his paper thus :—

"The woman suffered from a catarrhal vaginitis, in the discharge of which the *Trichomonas vaginalis* Donn  was found, and which cleared up on the elimination of these micro-organisms by means of alkaline douches ; also from an acute gingivitis from which the same organisms were obtained (probably from an auto-infection from the vagina), superimposed upon a mild chronic amoebic gingivitis, the acute signs showing no improvement from a thorough administration of emetine but promptly disappearing upon the elimination of the *Trichomonas* by means of alkaline washes, leaving behind the amebae and characteristic signs of their ravages, which are now responding to the emetine treatment.

"Consequently from pathologic and therapeutic viewpoints the vaginal catarrh and the acute gingivitis were due to the pathogenic activities of the *Trichomonas vaginalis*, whether predisposed to by previous local conditions or not ; which clinical evidence receives strong support from experimental production of a *Trichomonas* diarrhoea in a rabbit inoculated with these organisms from a culture.

"This artificial cultivation of the *Trichomonas vaginalis* Donn  and experimental transmission of the infection to a lower animal is, so far as we can ascertain, the first success in either direction , and falls short of a definite proof of the pathogenicity of the organism only in that our cultures were contaminated with bacteria, which fault we have counteracted to

some extent by failing to produce diarrhea in a control rabbit injected with a tube of culture in which the Trichomonads were killed by exposure to cold.

"In addition we wish to say that the principle of treatment aimed at, prevention of the propagation of the organism by means of alkalization, is apparently effective in *Trichomonas* infections."

H. B. Fantham.

MESNIL (F.). **A propos du flagellé nouveau décrit par MM. Derrieu et Raynaud (*Pentatrachomonas* = *Hexamastix* D. et R. nec Alexeieff).**  
--*Bull. Soc. Path. Exot.* 1915. Oct. Vol. 8. No. 8. pp. 574-575.

The author points out that the descriptions of the genus *Hexamastix* of DERRIEU and RAYNAUD and of *Hexamastix* of ALEXEIEFF do not apply to the same organism. [ALEXEIEFF used the name for the organism formerly known as *Polymastix batrachorum* from amphibia, while DERRIEU and RAYNAUD used it for a flagellate found in a case of chronic human dysentery, see this *Bulletin*, Vol. 4, p. 316.] The generic name *Hexamastix* is valid for the six-flagellate Protozoön re-named by ALEXEIEFF. The other flagellate from man, having five anterior flagella, described by DERRIEU and RAYNAUD must be placed in the genus *Trichomonas*, sub-genus *Pentatrachomonas* Chatterjee [see this *Bulletin*, Vol. 6, p. 470].

H. B. F.

da FONSECA (Olympio O. Ribeiro). **Sobre os flagellados dos mamíferos do Brasil. Um novo parasito do homem. (2ª. Nota prévia.)**  
[A New Flagellate Parasite of Man.]--*Brazil Med.* 1915. Sept. 22. Vol. 29. No. 36. pp. 281-282.

The author first shortly reviews the Protomonadine flagellates of man. He places the *Lambli intestinalis* of Lambl in the genus *Giardia* Kunstler. *Cercomonas longicauda* and *Cercomonas parva* have been obtained from cultures of human faeces.

Writing from Manguinhos, Brazil, he briefly describes a new flagellate parasite of man, belonging to the Tetramitidae sensu lato, under the name *Enteromonas hominis*, nov. gen. et nov. sp. The generic characters are that the parasite is a Protomonadine with a spherical body, possessing a large recurrent flagellum and two smaller anterior ones.

Specific characters are that the body is almost always regularly spherical, with a diameter of about  $5\mu$  to  $6\mu$ , sometimes with one extremity drawn out into a short tail. The periplast is rigid. The alveolar endoplasm may contain inclusions such as bacteria. No cytostome and no axostyle are present. The nucleus is anterior and about  $1\mu$  in diameter, and is a protokaryon, containing a karyosome.

The three flagella arise from a single basal granule, anterior to the nucleus, and united thereto by a rhizoplast. The organism divides by longitudinal fission.

The flagellate was found in the fresh faeces of a dysenteric patient. [It is to be regretted that a diagram of the new flagellate was not given.]

H. B. F.

da CUNHA (Aristides Marques). **Sobre a presença de "Selenomonas" no coecum dos roedores.** (Nota prévia.) [Selenomonas in the Caecum of Rodents.]—*Brazil Med.* 1915. Feb. 1. Vol. 29. No. 5. p. 33.

The author, writing from the Instituto Oswaldo Cruz, briefly refers to previous work on organisms first seen by CERTES in 1889 in the stomach of ruminants. PROWAZEK placed them in the new genus *Selenomonas*, which the author thinks has priority over the name *Selenomastix* adopted by WOODCOCK and LAPAGE [see this *Bulletin*, Vol. 3, p. 515]. The organisms are now recorded from the caecum of the guinea-pig, *Cavia porcellus*, and from *Cavia apereu*. The parasites, which measure  $8\mu$  to  $12\mu$  by  $2\mu$  to  $3\mu$ , are crescentic, and from the middle of the concave side of each a flagellum arises. The chromatin is diffusely and peripherally disposed in the body. Rounded forms of the parasite have not yet been seen in rodents.

H. B. F.

MACFIE (J. W. Scott). **Babesiasis and Trypanosomiasis at Accra, Gold Coast, West Africa.**—*Ann. Trop. Med. & Parasit.* 1915. Dec. 30. Vol. 9. No. 4. pp. 457-494. With 2 plates and 6 charts.

The author examined blood films made from animals sent to the Accra slaughter-house. The Piroplasmidae found are shown in the following table:—

TABLE I.—The results of the examination of 500 domestic animals for babesiasis.

Host.	Number examined.	Number infected with Piroplasms	<i>B. bigemina</i> .	<i>T. mutans</i> .
Cattle, hump-backed breed	100	53	7	49
Cattle, straight-backed breed	100	40	3	38
Sheep .. .. .	100	21	—	21
Pigs .. .. .	100	—	—	—
Goats .. .. .	100	—	—	—
Totals .. .. .	500	114	10	108

The infections appeared to be benign, but trypanosomes were sometimes also present and a coarse basophilia was observed in the blood. Various ticks were found on the cattle and sheep. The morphology of *Babesia bigemina* and of *Theileria mutans* is described.

One case of imported canine babesiasis was observed.

The author describes and figures a new piroplasmid, *Nuttallia decumani*, n. sp., found in the blood of *Mus decumanus*. Four brown rats out of twenty examined were found to be infected with this

unpigmented, amoeboid or ring-shaped parasite. In division there are four lanceolate parasites arranged in the form of a cross, each has a nucleus near its middle and in addition a second minute chromatin dot could usually be seen at the distal end. No pairs of pyriform parasites were found. Grahamella bodies also occurred in the blood of some of these rats.

Three types of trypanosomes were found at Accra and have been identified as *T. pecaudi*, *T. vivax* and *T. congolense*. Their distribution is shown in the following table :—

TABLE II.—Trypanosome infections found in animals killed at the Accra slaughter-house.

Host.	Number examined.	Number infected with trypanosomes.	Percentages infected with		
			<i>T. vivax.</i>	<i>T. congolense.</i>	<i>T. pecaudi.</i>
Cattle, hump-backed ..	100	92	76	28	12
Cattle, straight-backed	100	18	14	6	1
Sheep .. .. .	100	4	3	2	—
Pigs .. .. .	100	5	—	5	—
Goats .. .. .	100	1	1	1	—
Totals .. .. .	500	120	18.8	8.4	2.6

In the case of *T. pecaudi* posterior nuclear forms were not found in cattle but were obtained in subinoculated rats. The morphology, dimensions and distribution by percentages in respect to length are given for each trypanosome.

One dog had a slight infection with a parasite of the *T. congolense* type.

Nineteen cases of trypanosomiasis in equines were observed during nine months. Their distribution is summarised in the following table :—

TABLE III.—Equine trypanosomiasis at Accra.

Host.	Cases of trypanosomiasis seen.	Number infected with		
		<i>T. vivax.</i>	<i>T. congolense.</i>	<i>T. pecaudi.</i>
Horses .. .. .	13	2	4	7
Mules .. .. .	5	—	—	5
Donkeys .. .. .	1	—	1	—
Totals .. .. .	19	2	5	12

A small monomorphic trypanosome was found in the blood of a mare, which had been brought from England some years before. The animal had not been out of Accra for at least eight months before the commencement of an illness marked by oedema and plaques on the skin. The treatment of the animal by atoxyl was interrupted by the owner, and she died after two months. The parasite was of the *T. congolense* type, but some of the trypanosomes had their nucleus near the anterior or flagellar end. An extra chromatin dot was seen immediately posterior to the nucleus in certain of the parasites sometimes found late in the disease. The dimensions and distribution of the parasite by percentages in respect to length are given. It is suggested that the trypanosome is a new variety and should be named *T. congolense* var. *equinum*.

Two cases of trypanosomiasis were observed in mules, the disease resembling acute dourine. The causal agent was polymorphic and of the *T. pecaudi* type. Only a few trypanosomes were found in the blood. The disease was not contracted in coitus. The author compares the parasite with *T. equi* [this *Bulletin*, Vol. 3, pp. 39-40].

H. B. F.

CHALMERS (A. J.) & ARCHIBALD (R. G.). **Babesia or Piroplasma : A Reply to Dr. Leiper.**—*Jl. Trop. Med. & Hyg.* 1915. Oct. 1. Vol. 18. No. 19. p. 217.

The authors, referring to previous discussion on the subject [see *Bulletin*, Vol. 5, p. 287] state :—

"There is no one who will dispute that a worm is an animal and that a moss is a plant, but with regard to the Protista the matter is quite different, and one set of authorities may declare that a given organism is an animal and therefore comes under the rules of zoological nomenclature, while another equally weighty set of authorities may maintain that it is a plant, and that it comes under the rules of botanical nomenclature."

In illustration is taken the name *Haematococcus* given by BABES in 1888 to a Piroplasm but pre-occupied by AGARDH having given it in 1828 to an algal coccus form. Also the true nature of TREVISAN's *Babesia xanthopyretica* found in yellow fever is open to doubt.

The nomenclature of the organism called Piroplasma is admitted to be in an extremely confused state. The first rule of zoological nomenclature is quoted in the original French, and also the fourth rule of botanical nomenclature is given.

H. B. F.

VELU (H.) & EYRAUD (A.). **Observations sur diverses formes de Piroplasmes, rencontrées sur des bovins indigènes de la Chaouïa.**—*Bull. Soc. Path. Exot.* 1915. Nov. Vol. 8. No. 9. pp. 643-646.

The authors record the chief clinical symptoms observed in bovine piroplasmiasis on a farm in the neighbourhood of Casablanca, Morocco. The disease was often fatal to the indigenous animals. Salicylarsenate of mercury was twice injected, 15 cgm. at a time, into the jugular vein. The various forms of the piroplasms were recorded in percentages; the pyriform stages were stated to be extremely rare. The ovoid forms predominated. [From the number of bacillary forms recorded, it is possible that a Theileria was also present.]

H. B. F.

CARPANO (Matteo). **La febbre della costa Mediterranea. Piroplasmosi tipo 'parvum' nei bovini del basso bacino del Mediterraneo**, [Mediterranean Coast Fever. Piroplasmosis of the 'Parvum' Type in Cattle in the Lower Mediterranean Basin.]—*Ann. d'Ig. Sperimentale*. 1915. Vol. 25. N. Ser. No. 4. pp. 342-410. With 2 plates and 18 figs.

An account of a very fatal outbreak of coast fever amongst Serbian cattle imported into Tripoli for the use of the Italian army. The animals were herded on arrival with supplies of native cattle, and the disease broke out after an incubation period of 30 days. The attacks were at the rate of 100 per cent. of the cattle imported, and the mortality 90 per cent.; the pecuniary loss thus occasioned amounting to 100,000 lire in two months. Cattle simultaneously imported from Tunis, Sardinia and Sicily, however, showed much greater powers of resistance. The author isolated from the blood of the affected animals two types of parasite, namely *Theileria parva* and *Piroplasma annulatum* (= *tropicum*), and the greater part of his very long memoir is devoted to a consideration of the morphological differences between the two, and the relative parts played by them in causing the infection. It would appear that the native cattle of Tripoli harbour both these parasites without the production of any marked symptoms, so that the native agriculturists are not acquainted with the disease. The channel of infection is the tick *Hyalomma aegyptium*, which is plentiful in the sandy soil. Therapeutic treatment with formol and trypan-blue was not attended with any good result.

Inoculation experiments with blood carried back to Italy gave rise to febrile attacks in the calves inoculated, which was followed by anaemia, and the appearance of *P. annulatum* in the blood. There is a bibliography of recent work on the subject of piroplasmosis at the end of the paper, which the specialist may find useful.

J. B. Nias.

ARANTES (J. B.). **I. Infecções experimentaes pelo "Toxoplasma."**  
**II. Novas localizações deste protozoario. III. A bipartição é o seu unico processo de multiplicação. (2a Nota preliminar.)** [Experimental Infections with Toxoplasma; New Localizations of the Parasite; Bipartition its only Method of Multiplication.]—*Brazil Med.* 1914. Oct. 22. Vol. 28. No. 40. pp. 373-376.

A continuation of a memoir on experimental infections with *Toxoplasma canis*, of which the first part was noticed in this *Bulletin*, Vol. 3, p. 520. The author finds that pigeons are the best laboratory animals for continued transmission of the parasite; guinea-pigs and rabbits less so. Emulsions of the liver, lung or brain of an infected animal should be injected into the pectoral muscle of the pigeon, the dose being 1 cc. The brain appears to be the seat of election of the parasite, and in sections of that organ properly fixed with sublimate-alcohol or formol it can be seen that the parasites multiply only by binary division. Smears on the other hand fixed with alcohol give the false impression that schizogony occurs.

J. B. N.

SCOTT (John W.). **Some Notes and Experiments on *Sarcocystis tenella*, Railliet.**—*Jl. of Parasit.* 1915. Sept. Vol. 2. No 1. pp. 20–24.

The experiments mentioned in this paper were performed in the University of Wyoming. Sheep and lambs were used. The results are best summarised in the author's own words, thus:—

“To sum up this paper, one may say that the experiments are chiefly important for their negative significance. Infection with *S. tenella* failed to occur, (a) as the result of feeding infected muscle, (b) as the result of eating grass contaminated with feces from a carnivorous animal previously fed on infected muscle, and (c) by allowing infected muscle to decay either on dry grass or in a pond. The apparently positive results of the third experiment are best explained as due to conditions independent of that experiment. All of the evidence favors the view that the sheep is not the definitive host of *S. tenella*, and therefore is in accord with Darling's suggestion that the muscle parasites of vertebrates are aberrant forms.”

H. B. F.

de MELLO (Froilano). **Preliminary Note on a New Haemogregarine found in the Pigeon's Blood.**—*Indian Jl. Med. Research.* 1915. July. Vol. 3. No. 1. pp. 93–94. With 1 coloured plate.

The author, working in Nova Goa, Portuguese India, found a haemogregarine (strictly a leucocyto-gregarine) in the blood of pigeons from Mapuçá (Bardez). The parasite occurs in the large and medium sized mononuclear leucocytes. The organism is considered to be a new species, and is called *Haemogregarina francae*. The medium sized mononuclear cells are more particularly infected.

Many of the parasites are rounded, and vary in size from  $3\mu$  to  $7\mu$ . Schizogony occurs in the hepatic cells, more rarely in the peripheral blood and bone-marrow. Binary fission was also observed, wherein rudimentary karyokinesis occurred.

The pigeons were infested with *Lynchia maura*, but no stages of the parasite were seen therein, although search was made.

The various trophic and schizogonic stages of *H. francae* are depicted diagrammatically in a coloured plate of 10 figures.

H. B. F.

KOHL-YAKIMOFF (Nina) & YAKIMOFF (W. L.). **Hämogregarinen der Seefische.**—*Centralbl. f. Bakt.* 1. Abt. Orig. 1915. May 20. Vol. 76. Nos. 2 and 3. pp. 135–146. With 4 plates

The authors have found a number of Haemogregarines in fish obtained by the fishing smacks of Naples. The parasitised fish were *Gobius capito*, *G. jozo*, *G. aurantus*, *G. cruentatus*, *G. paganellus*, *Torpedo marmorata*, *Solea lutea*, and *Blennius trigloides*.

The haemogregarine from the blood of *Gobius capito*, named by WLADIMIROW *Haemogregarina yakimowi-kohl*, is described in detail, and tables of dimensions are given. Two varieties of parasites are distinguished. The first are short, thick organisms, found singly or in twos, fours or eights within erythrocytes or also free. The differences in dimension are very trifling, whether the number in the erythrocyte is large or not. The second variety forms gametes, which are large, thin, more or less bowed organisms. The male gametes are considered to be the thinner forms, while the thicker ones are female in character. The number of gametes in an erythrocyte may be from one to eight.



The life-cycle is considered to be as follows:—A free-swimming schizont enters an erythrocyte, where schizogony by three times repeated binary fission results in the production of eight merozoites. Some of these merozoites give rise to sexual forms. Whether the gametes leave the erythrocytes and become free in the blood stream is not known.

The haemogregarine is considered to be specific to *Gobius capito*, attempts to inoculate the parasite to a number of other fish having been negative. Differences between this organism and other Haemogregarines of sea fish are given.

*Haemogregarina wladimirovi*, n. sp. from the blood of *Gobius cruentatus* is also described; 1, 2, 4, 8 and 16 merozoites have been seen within an erythrocyte. Similar numbers of gametes were also observed. Multiplication takes place chiefly by the division of young individuals into two. Free-swimming parasites were not seen. It is considered to be a new species because of the number of its gametes (16).

*Haemogregarina hartochi*, n. sp. from the blood of *Gobius aurantus* forms 1, 2, 6 and perhaps 8 merozoites. The full number has not been found. Two and four gametes were produced.

*Haemogregarina murzinowskii*, n. sp., is described from the blood of *Gobius jozo*. Merozoites were found singly and in twos, gametes in twos and fours. Free-swimming schizonts were observed and also gametes in the act of leaving the erythrocytes.

*Haemogregarina lo Bianci*, n. sp. was obtained from the blood of the Torpedo, *T. marmorata*. Merozoites only were found.

*Haemogregarina londoni*, n. sp. occurred in the blood of *Blennius trigloides*. The infection was slight. One merozoite was seen. Gametes occurred singly or in twos in the erythrocytes. Further work is needed on this parasite.

*Haemogregarina clavata*, Neumann, has been seen by the present workers in the blood of *Solea lutea*. No gametes were seen in the erythrocytes, but were found lying free near the remains of red blood corpuscles whose cytoplasm had been dissolved.

*Haemogregarina polypartita*, Neumann, occurred in blood smears of *Gobius paganellus*, but the authors state that nothing of interest was seen.

Four coloured plates illustrate the paper.

H. B. F.

STEVENSON (A. C.) & WENYON (C. M.). Note on the Occurrence of *Lankesteria culicis* in West Africa.—*Jl. Trop. Med. & Hyg.* 1915. Sept. 1. Vol. 18. No. 17. p. 196.

The authors found a Gregarine, *Lankesteria culicis*, in *Stegomyia fuscata* bred in London from dried eggs sent from Sierra Leone. The Gregarine is also known in these mosquitoes in India, South America and Bagdad. The sporocysts of the parasite successfully resisted the drying undergone by the mosquito eggs, and the mosquito larvae hatching from the eggs became infected by ingesting the sporocysts. The Gregarine has passed through several generations of mosquito in England.

H. B. F.

WEIDMAN (Fred D.). *Coccidium bigeminum* Stiles in Swift Foxes (Habitat Western U.S.)—*Jl. Comp. Path. & Therapeut.* 1915. Dec. Vol. 28. Pt. 4. pp. 320-323. With 3 text-figs.

Coccidian oöcysts were found in the faeces of two swift foxes, one of which had diarrhoea. After isolation both animals showed diarrhoea, one more marked than the other. The oöcysts were more numerous in the latter and after about a week it died. The second swift fox spontaneously recovered. The oöcysts have a double contour, and when mature contain two sporocysts (spores) each enclosing four sporozoites. The oöcysts are subspherical to elliptical in form and when mature measure  $25\mu$  to  $38\mu$  by  $25\mu$  to  $30\mu$ . Younger cysts at first only contain a single spore. A mature spore measures  $18\mu$  to  $22\mu$  in diameter. Five to seven days "would appear to be the period which must elapse before the organism attains its infective stage."

The autopsy on the dead animal "disclosed a most marked haemorrhagic and ulcerative enteritis involving both small and large parts of the bowel." In sections "naked protozoa were found in the margin of the ulcer." No parasites were seen in epithelial cells or in villus stroma. Oöcysts were found on the mucosal surface and were similar to those seen in freshly-passed faeces. "A new varietal name *canivelocis*" is suggested.

The pathogenicity and economic importance of the parasite should be further investigated. [The organism is now usually referred to the genus *Isospora*.]

H. B. F.

CRUZ (Oswaldo). *Algumas molestias produzidas por protozoarios, Conferencia feita na Bibliotheca Nacional.* [Some Diseases caused by Protozoa. A Lecture delivered at the National Library.]—*Brazil Med.* 1915. Nov. 20. Vol. 29. No. 44. pp. 345-348; Nov. 27. No. 45. pp. 353-356.

An interesting lecture of a popular character delivered by Dr. Oswaldo Cruz to, apparently, a lay audience, describing the principal successes of the Brazilian school of medicine in dealing with tropical diseases in recent years. The chief points touched on are the following:

1. A particular type of quartan malarial fever exists in the Amazon Valley, which is characterised by a liability to oedema of the legs. This has been studied by CHAGAS, and is probably due to a distinct variety of quartan parasite.

2. The Anopheline mosquitoes of Brazil have been thoroughly studied, principally by LUTZ, after whom two new species have been named, *Myzomyia lutzii* and *Myzorhynchella lutzii*. LUTZ has shown that the former of these breeds in receptacles formed by the imbricated leaves of certain species of Bromelia, which catch the rain-water. CHAGAS and NEIVA have also shown that some of these anophelines bite before nightfall. The resistance of the malarial parasite in Brazil to quinine is often extreme, a matter which imports difficulties into prophylaxis. This point has also been studied by NEIVA.

3. Leishmaniasis in Brazil is of a very virulent type, and seldom shows any tendency to spontaneous cure. VIANNA has, however, found a specific for it in intravenous injections of tartar emetic.

4. A full and very interesting account is given of the steps by which CHAGAS succeeded in demonstrating the existence of a special form of trypanosomiasis, distinguished by goitrous symptoms, and conveyed by the bites of various species of *Triatoma*, a haematophagous insect found not only in Brazil, but also in most of the countries of tropical America. Attempts are at present being made to find a specific treatment for this disease on the lines found successful with other trypanosomes, the work being principally in the hands of MACHADO. The rebuilding of houses with other materials than dry mud, full of cracks which harbour the *Triatoma*, is being urged everywhere and by this means the town of Bello Horizonte, to take one example, which was formerly termed "a nest of cretins," is now nearly free from the disease.

5. Small-pox has been successfully investigated by ARAGÃO and PROWAZEK, the latter lately deceased in Europe while studying typhus fever, and by the use of agar-filters they appear to have isolated in a state of purity the presumed parasite.

6. ARAGÃO has further successfully studied the life history of *Haemoproteus columbae*.

As a result of these discoveries, the Schaudinn medal has already been twice conferred on Brazilian observers, first on PROWAZEK, and secondly on CHAGAS.

J. B. N.

SWELLENGREBEL (N. H.). **Cytologische problemen in het licht van de resultaten van het protisten-onderzoek.** [Cytological Problems in the Light of the Result of Researches on the Protista.]—*Handelingen van het Vijftiende Natuur- en Geneeskundig Congres.* Amsterdam. 1915. April 8, 9 & 10. 12 pp

A discussion of HERTWIG's view that sexual reproduction is a necessity in the life-cycle of all living organisms in order to prevent what he terms "physiological degeneration," arising from continuous asexual multiplication. The writer's conclusion, derived principally from the study of pathological amoebae, is that the existence of "physiological degeneration" thus arising, is not a fact, and that consequently, whatever the significance of sexual reproduction may be, it is not an indispensable condition of life.

J. B. N.

RODHAIN (J.). **Quelques hématozoaires de petits mammifères de l'Uele (Ouellé), Congo Belge.**—*Bull. Soc. Path. Exot.* 1915. Dec. Vol. 8. No. 10. pp. 726-729. With 3 figs.

Three organisms are described in this paper:—

(i) *Trypanosoma dendromysi* n. sp. This flagellate was found in the blood of climbing mice, *Dendromys* sp. It appears to be of the *T. lewisi* type, as its nucleus is situated at the anterior third of the body, but the blepharoplast is small and punctiform. It is  $30\mu$  to  $33\mu$  long, by  $4\mu$  to  $5\mu$  broad, with a free flagellum of  $10\mu$  to  $12\mu$ . Detailed measurements are given.

(ii). Haemogregarine in *Cricetomys gambianus*. The parasite occurs in the red cells of the host, and recalls *H. balfouri*. The parasitised

red cell becomes elongate and pale, attaining a length of  $14\mu$ . The average dimensions of the parasite are  $10\mu$  long by  $3.7\mu$  broad, the nucleus occupying about two-thirds of the body. Grahamella-like bodies also occurred in the red cells of the host. Larval ticks were found on some of the *Cricetomys*.

(iii). Plasmodium of the bat *Epomophorus franqueti*. Each of four animals (bats) examined was found to be parasitised. [See this *Bulletin*, Vol. 4, pp. 379–380, for remarks on a similar parasite.]

H. B. F.

**MINCHIN (E. A.). Remarks on the Nature and Significance of the So-called "Infective Granules" of Protozoa.**—*Ann. Inst. Pasteur*. 1915. Nov. Vol. 29. No. 11. pp. 537–544. With 2 figs.

The expression "endogenous buds" is preferred to that of "cell granules" by the author. The formation of endogenous buds begins by the concentration of chromidia. "Each bud, when complete, has the morphological and cytological value of a true cell, very minute in size and reduced almost entirely to its chromatin elements." He recalls that LISTON and MARTIN observed internal bud formation in amoebae. The infective granules of trypanosomes are considered to be minute buds consisting of chromidial grains given off from the nucleus. These buds ultimately develop into trypanosomes. Similar chromidial granules are given off from haemogregarines. In these Protozoa secondary reduction in the size and structure of these buds has occurred, possibly as an adaptation to parasitism in the blood.

The author's summary is as follows:—

"This brief note does not bring forward any facts hitherto unknown, but attempts to compare and coordinate certain known facts with a view to demonstrate their essential similarity and homology. The conclusion reached is that the phrase 'infective granule' is misleading and erroneous, since the bodies so termed are true endogenous chromidial buds. Consequently the term 'granule-formation' should be replaced by 'endogenous bud-formation' and the term 'granule shedding' by extrusion of buds or some similar phrase."

H. B. F.

**PORTER (Annie). On Anaplasma-like Bodies in the Blood of Vertebrates.**—*Ann. Trop. Med. & Parasit.* 1915. Dec. 30. Vol. 9. No. 4. pp. 561–568. With 10 text-figs.

The Anaplasma-like structures observed were found in mice, canaries, sparrows, martins, lizards, snakes, frogs, toads, and sticklebacks, that is, representatives of all the groups of the Vertebrata. The animals were used in collaboration with FANTHAM on researches into the experimental introduction of insect flagellates (*Herpetomonas* and *Crithidia*) into different vertebrates. The hosts thus infected were often anaemic. Blood films and organ smears were examined and compared with blood films of natural anaplasmosis in South African cattle, and with preparations from obscure cases of human anaemia.

Morphologically, Anaplasmata are minute, rounded granules, staining like chromatin, about  $0.3\mu$  to  $2\mu$  in diameter. They occur

in the erythrocytes and the erythroblasts of the vertebrate host. Apparent multiplication forms, either diplococcoid or rosette-like, may be seen.

In the nucleated red blood corpuscles of snakes, minute granules of nuclear material were seen to be budded off and to assume the appearance and position of Anaplasmata. On a few occasions similar structures were observed in the blood of anaemic young mammals in which nucleated red cells were obvious.

The nature of Anaplasmata is discussed, and the works of SMITH and KILBORNE (1893), THEILER (1910), DIAS and ARAGÃO (1913-1914) and VEGLIA (1915) are summarised. The possibility that Anaplasma-like bodies may be the initial stages of *Leishmania* is also mentioned. "If Anaplasma be considered organismal, it affords an interesting example of what is, perhaps, a phylogenetic and recapitulative type of primitive Protozoön. Anaplasma might also represent an organism which has been secondarily reduced in size and structure."

The author's summary is as follows :—

"Anaplasmata may occur in healthy and in anaemic vertebrate blood. The structures, also called marginal points and peripheral coccus-like bodies, are probably of diverse origin. It is doubtful if they are organismal in nature.

"Anaplasmata have been found by me in warm and cold-blooded vertebrates, wherein conditions such as herpetomoniasis and anaemia occurred. Some of the bodies originate from the nucleus of the erythrocyte or erythroblast, under the influence of haemolysis.

"The Anaplasma-like bodies were basophilic, apparently composed of chromatin or of a substance giving a similar staining reaction, and were homogeneous in structure. They varied from  $0.3\mu$  to  $2.0\mu$  in diameter, often being about  $0.5\mu$ . Binary and multiple forms, which might be interpreted as phases of division, were seen."

H. B. F.

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## SLEEPING SICKNESS.

REPORTS OF THE SLEEPING SICKNESS COMMISSION OF THE ROYAL SOCIETY. No. XVI.—viii + 221 pp. With illustrations. 1915. London: Printed under the Authority of H. M. Stationery Office. [Price 8s.]

The 16th Report of the Sleeping Sickness Commission of the Royal Society purports to contain a complete account of the work of the Commission in Nyasaland. It consists of an Introduction and Sections A to F, treating of the examination of the Nyasaland mammals and tsetse flies for trypanosomes, the trypanosome diseases of man and domestic animals in that country, a description of three strains of *T. gambiense* from Lake Tanganyika, and Trypanosomes and other Parasites of Animals in Nyasaland. There are in addition six appendices, maps showing where sleeping sickness and tsetse flies were found, and numerous coloured plates. The Director, Sir David BRUCE, reached Kasu Camp, where the bulk of the work was done, in January 1912 and the Commission finally left Kasu in March 1914. Kasu is 30 miles to the west of Lake Nyasa and about 3,500 feet above sea level. Thermometer readings were taken throughout by Mr. James WILSON; the maximum, minimum and mean for each month are shown in an appendix. The mean maximum ranged from 64·6° in July to 79·8° in November, the mean minimum from 59·5 to 74·4°, in the same months. Photographs illustrate the buildings and type of country. The introduction includes a definition of terms used, and a summary of the work done. It is noted that 28 strains of *T. brucei* vel *rhodesiense* were worked with and the conclusion arrived at was that all belonged to the same species. Some practical recommendations complete the introduction.

Of Sections A–F the bulk has been published in the *Proceedings of the Royal Society* and summarised in Vols. 1, 2 and 4 of this *Bulletin*. It is not possible to go again over this ground. The account that follows refers chiefly to unpublished work.

Examination of the Nyasaland Fauna.—A table is given of the small animals found in the Proclaimed Area which were examined for trypanosomes; it includes 400 monkeys (*Cercopithecus pygerythrus whytei* Thos.), 77 shrews (*Petrodromus venustus*), 12 baboons and smaller numbers of other animals, among which is one ant-bear. Pathogenic trypanosomes were not found. It is concluded that the part played by the small mammals in the spread of trypanosome disease to man and the domestic animals “is probably infinitesimal and may be ignored.” A list is given of the wild animals shot in fly-free areas whose blood was examined microscopically for trypanosomes. None was found. It was not practicable to inoculate susceptible animals. Of the 113 all are antelope, excepting six warthog, six zebra, an elephant and a hippopotamus. Of 140 goats whose blood was examined in the fly country six were found to be infected, with *T. pecorum* (5), *T. capræ* (1). Of 22 dogs eight were found infected, *T. pecorum* (6), *T. brucei* vel *rhodesiense* (2). Here again inoculation was not used. The state of health of the animals is not mentioned. The conclusion is that the domestic animals living in

the Sleeping Sickness Area "may act to some extent as reservoirs of the disease, but their number in fly-areas is so small that they probably constitute little or no danger."

Section B contains no new matter except a description of *G. morsitans* feeding.

Trypanosome Diseases of Man and Domestic Animals in Nyasaland.—Section C, which is concerned almost entirely with *T. brucei* vel *rhodesiense*, opens with an account of the three groups [this *Bulletin*, Vol. 5, p. 83] containing nine species of trypanosomes. A short description of each follows and then a discussion of the identity or non-identity of *T. brucei* and *T. rhodesiense*. The conclusion is that "evidence is accumulating from the geographical distribution point of view that this new kind of sleeping sickness is really caused by *T. brucei* . . . and that it is an endemic disease of the country." Here a map shows the localities in which Nyasaland sleeping sickness\* has occurred; they are scattered over eight degrees of both longitude and latitude.

An account of the clinical aspects of the disease, from other records, follows and then an account of the 28 strains of *T. brucei* vel *rhodesiense*, their morphology, the susceptibility of animals to them, and the development of some of them in the tsetse fly [pp. 41-161].

Some serum experiments, not previously published, are detailed. Human serum was found to have no effect on *T. brucei* vel *rhodesiense*, Human strain, Nyasaland, but a very marked effect on *T. brucei*, Zululand strain, the effect being tested by inoculation into rats. This result, which might be used as an argument for the non-identity of these strains, is regarded as the consequence of residence in the milieu from which they were respectively taken. Other serum experiments are given, "as a slight basis for future work."

Of Section D, *T. pecorum*, *T. simiae* and *T. cuprae* form the subject.

Section E is new. The morphology of three strains of *T. gambiense*, sent by Dr. KLEINE from Lake Tanganyika, was studied in rats by the biometric method, familiar to readers of these papers. A curve for each strain is published, one of which differs widely from the other two. The following are the conclusions:—

"1. *Trypanosoma gambiense*, Tanganyika, is very similar in morphology to *T. brucei* vel *rhodesiense*, the trypanosome causing disease in man in Nyasaland, but it would appear to be possible to distinguish between them by the blunt-ended posterior-nucleated forms which are so common in the blood of rats infected by the latter and absent in rats infected by *T. gambiense*.

"2. It would appear to be impossible at present to distinguish between the two by microscopic examination of the parasites as they occur in the blood of man."

The susceptibility of animals to these three strains is shown in a series of tables, which illustrate the difficulty of infecting experimental animals with *T. gambiense* till the trypanosome has become accustomed to any particular species. Lastly, twelve experiments were made to see if this trypanosome would develop in laboratory-bred *G. morsitans*; two were positive. Five hundred and five flies were used, and twelve

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\*Elsewhere in this number this disease is called Rhodesian sleeping sickness. Seeing that *T. gambiense* infections have been recorded from the northern borders of Rhodesia, where *G. palpalis* is or was found, it seems preferable to speak of Nyasaland sleeping sickness.

infected flies were found, or 2·3 per cent., but it is thought that some escaped attention [*cf.* TAUTE's experiments, *Sleeping Sickness Bulletin*, Vol. 3, p. 391 and Vol. 4, p. 269]. The flies took 50–60 days to become infective.

Section F contains a description, with coloured plates, of *Trypanosoma cephalophi*, *T. petrodromi* and other blood parasites.

The Appendices chiefly relate to tsetse flies and do not seem to add much to our knowledge. Three of these are by Dr. J. E. S. OLD, Major HAMERTON, and Staff-Sergeant GIBBONS, respectively.

A. G. B.

GREGGIO S. J. (R<sup>d</sup> P. G.). **La Trypanose humaine et la Natalité infantile dans la région de Kisantu (Moyen Congo belge).—Influence du traitement atoxylé.**—*Bull. Soc. Path. Exot.* 1915. Dec. Vol. 8. No. 10. pp. 752–764.

Two years ago the author collected and published figures on the subject of the birth-rate and infantile death-rate among natives of Kisantu in Belgian Congo; he was careful to exclude any families of which a member was infected with trypanosomiasis. The families with which this paper is concerned were those in which one or both parents were so infected. Forty-six families were studied both before and after treatment of the infected persons with atoxyl. The results are shown in tables, wherein is recorded the name of the parent or parents, date of marriage, number of children born before treatment and their fate or present state, date and amount of atoxyl given, number of children born after treatment and their present state, and the present state of the patient. In 15 families the father was the patient, in 25 the mother, and in six both parents. The methods by which atoxyl was given are detailed. The dose was regulated by the patient's weight, and the drug was not finally discontinued till the number of grams of atoxyl taken was about three-fourths of the number of kilogrammes of the patient. The tables are analysed.

The author remarks that he did not find any child which could be shown to have contracted the disease from its parents. Infected mothers had a high proportion of abortions. Whereas in normal families these form 7·4 per cent. of births, here they are 31·7 per cent. In these cases also the infantile mortality is raised from 29 per cent. to 48 and 50 per cent., to which neglect of the children contributes. While trypanosomiasis of the father, even when not treated, does not appear to have direct results on the viability of the child, the figures show a marked diminution of infant mortality after the treatment of the father, a curious fact which the author tries to account for. The influence of treatment on the mother is striking, the figures for infantile mortality and abortion respectively falling from 48 to 20 per cent. and from 38 to 10 per cent.

In his conclusions the author remarks that sleeping sickness depeoples Africa not only by killing adults, but also by augmenting the infantile mortality and increasing the abortion rate. Atoxyl treatment prolongs the life of the parents and increases the well-being of the family. It also increases the number of births while preserving the life of the father, and it lessens the infantile mortality.



The following table is given by the author, as summing up his observations :—

Healthy households.

Birth-rate per 100 households per year.	Death-rate per 100 infants per year.	Miscarriages per 100 infants per year.
51	29	7.4

Households with Trypanosomiasis.

42.1	34.6	19.6
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A. G. B.

AUBERT (P.). *Grossesse et trypanosomiase.*—*Bull. Soc. Path. Exot.* 1915. Oct. Vol. 8. No. 8. pp. 578-582.

According to the author, abortion, which is a frequent event among the natives in French Congo, is usually attributed in the colony to criminal action. He thinks that many cases have a pathological cause and amongst these causes trypanosomiasis takes a high place. The object of his paper is to call attention to this factor in the limitation of native births and to show the preventive effect of treatment. Details of four cases are given. The observations which follow are drawn from the conclusions. Menstruation, he finds, persists for almost the whole duration of the disease. Abortion, premature birth, still-birth, and death a few days after birth are the rule in trypanosomiasis. The efficacy of treatment varies with the period at which it is instituted, and with the activity of the drug employed. Treatment is usually effective if conception takes place during or after the course, ineffective when the treatment commences during the pregnancy. The most useful drugs are those, such as salvarsan, which do not entail a prolonged course of treatment, to which natives do not willingly submit. These points are illustrated by the cases.

A. G. B.

SIMPSON (J. T.). *Notes on the Treatment of Sleeping Sickness in Yel Sleeping Sickness Camp, continued up to April 1915.*—*Jl. R. Army Med. Corps.* 1915. Oct. Vol. 25. No. 4. pp. 428-430.

This paper deals with 145 cases treated with antimony and salvarsan and with antimony and atoxyl. They were originally reported on by the late Captain H. S. RANKEN, V.C., R.A.M.C. In describing the present condition of the patients the following terms are used :—Very good ; good ; fair ; poor. The meaning of these is explained.

*Antimony and salvarsan.*—Twenty-six selected persons were treated. They received “ five doses of one grain metallic antimony at three days’ interval intravenously, then 0.4 gm. salvarsan also intravenously,

then five more doses of antimony as before, then 0.4 gm. salvarsan, then five further doses of antimony." The peripheral blood was examined every three months (6 slides). With three exceptions these patients have been under observation in the camp for over two years. Five have died, 15 are in good condition, 4 in fair condition, 2 in poor condition.

*Antimony and atoxyl.*—Twenty-three selected persons were treated thus:—"Five doses of antimony (one grain) at three days' interval, then twelve doses (five grain) of atoxyl at three days' interval, then five further doses of antimony, then a second course of atoxyl, then a third course of antimony and a third course of atoxyl," after which all treatment was permanently stopped. The "very large majority" have been under observation for two years and longer. One has died, 2 are in very good condition, 14 in good condition, 5 in fair condition, one in poor condition.

Ninety-six cases have received more or less continuous treatment with antimony and atoxyl for two years after admission. Of these 21 have died, 37 are in good condition, 31 in fair condition and 6 in poor condition. The percentages work out thus:—

- |  |                   |      |           |
|--|-------------------|------|-----------|
| (1) Antimony and salvarsan :               | In good condition | 53.8 | per cent. |
|  | Died .. ..        | 19.2 | "         |
| (2) Antimony and atoxyl, 1st subdivision : | In good condition | 69.5 | "         |
|  | Died .. ..        | 4.3  | "         |
| (3) Antimony and atoxyl, 2nd subdivision : | In good condition | 38.3 | "         |
|  | Died .. ..        | 21.5 | "         |

It is noted that Classes 1 and 2 were specially selected and Class 3 not; and that the diet "cannot in any degree be called a generous one."

A. G. B.

van den BRANDEN. *Le sel sodique du Salvarsan cuprique dans le traitement de la Trypanose humaine, du Pian et de la Syphilis.*—*Bull. Soc. Path. Exot.* 1915. Oct. Vol. 8. No. 8. pp. 582-586.

Previous papers have been published by this author, who writes from the Leopoldville laboratory, on the use of salvarsan-copper, or  $K_3$ , in human trypanosomiasis [this *Bulletin*, Vol. 3, p. 167, and Vol. 5, p. 412]. The results of a single dose in early cases were decidedly good. This paper deals with the use of the sodium salt of  $K_3$  which, dissolved in water or syrup, gives a fluid of slightly alkaline reaction that can be injected. Thirty-four subjects of trypanosomiasis were treated intravenously, distilled water containing 5 per cent. of sugar being used as the vehicle. Doses between 0.1 and 0.6 gm. were well borne though intestinal disturbance was noted. Nine cases were treated with small repeated doses, with bad results. Ten cases received a single dose each, 0.2-0.45 gm. The results are tabulated. Of eight whose cerebro-spinal fluid is noted as normal, three relapsed within 1, 5 and 12 months, and five had not relapsed after 5, 8, 8, 12 and 12 months. It is concluded that massive doses, 7 cgm. per kilo body weight, give good results in human trypanosomiasis, comparable with those of salvarsan and neosalvarsan.

The results in the cases of yaws and syphilis were very good.

A. G. B.

DANIELS (C. W.) & NEWHAM (H. B.). **Treatment of Trypanosomiasis.**  
[Correspondence.]—*Lancet*. 1916. Jan. 8. p. 102.

The authors discuss the treatment of trypanosome infections in man and call attention to the difficulties and want of success in the treatment of "Rhodesian trypanosomiasis." They cite the case of a patient from Rhodesia who was admitted to hospital on November 3rd and treated with atoxyl and antilueticin; trypanosomes were always easily found. He then had intravenous injections of tartar emetic, which kept the blood free for two or three days.

"On Dec. 8th 30 minims of Martindale's injectio antimonii oxidi (equivalent to 1-20th grain tartar emetic) were given subcutaneously daily, and no trypanosomes were found till the 14th, and on that day 2 per 200 leucocytes were found, whilst on the 15th the number had increased to 3 per 200 leucocytes. On the 16th 30 minims of the injection of antimony oxide were given twice a day, and since then no trypanosomes have been found. These injections are painless, can be repeated, and cause no more trouble than, say, a morphia injection."

They think that an extended use of this drug is well worth while, especially as cases of this form of trypanosomiasis treated by other methods have always ended fatally.

A. G. B.

SCHAMBERG (Jay Frank), KOLMER (John A.) & RAIZISS (George W.).  
**Summary of Chemotherapeutic Studies in Experimental Trypanosomiasis.**—*Jl. Amer. Med. Assoc.* 1915. Dec. 18. Vol. 65. No. 25. pp. 2142-2144. With 4 text-figs.

This paper, which is illustrated by four photographs of syphilitic patients before and after salvarsan treatment, deals with the intra-peritoneal inoculation of rats with *T. equiperdum* and their treatment 24 hours later with intravenous injections of various substances. The strain employed [source not stated] killed the animals in 5-7 days. The inoculations were made by the method of KOLMER [this *Bulletin*, Vol. 6, p. 380], a known number of parasites being introduced. Other details given show that the experiments were conducted with much care. Mercury, copper, enesol, sodium cacodylate and iodine were without effect. "Scores of experiments were carried out with all the well-known mercurial salts." The only drugs that were found capable of destroying *T. equiperdum* in the blood of infected animals were salvarsan and neosalvarsan. German salvarsan and arsenobenzol prepared in the Dermatological Research Laboratory, Philadelphia, were tested side by side. The result is given in a table, which shows that the two preparations varied little in their trypanocidal effect and both were superior to German neosalvarsan. Seven rats treated with salvarsan were alive and trypanosome-free on the 24th day, but there the table stops. The controls died on the 7th and 8th days. The sterilizing dose is stated to be 15 mgm. per kilo body weight. Some account is also given of toxicity experiments; details will be given in a future communication. The paper closes with a brief account of the use of the authors' arsenobenzol preparation in man.

A. G. B.

**HINTZE (K.).** **Versuche zur Immunisierung gegen Trypanosomeninfektion.** [Immunisation Experiments against Trypanosome Infections.]—*Zeitschr. f. Hyg. u. Infektionskr.* 1915. Oct. 26. Vol. 80. No. 3. pp. 377–398.

The author notes that large series of experiments of immunisation against trypanosome diseases with the pure parasites themselves were first made by BRAUN and TEICHMANN. They experimented with mice, rats, guinea-pigs, rabbits and cattle and came to the conclusion that with trypanosomes obtained pure and killed by drying, an antigen could be produced which would with certainty protect mice, rats, guinea-pigs and rabbits against trypanosome infection [see this *Bulletin*, Vol. 1, p. 138]. The author sums up their results in a table. He next refers to the work of SCHILLING [*Sleeping Sickness Bulletin*, Vol. 4, p. 56], who killed the trypanosomes with a solution of tartar emetic and had some success in protecting rats. He then comes to his own experiments.

*Experiments with Dried Nagana Vaccine.*—The nagana strain came from the Hamburg Institute; it was kept up in white rats, which died regularly on the fourth or the fourth to fifth day. The animals were bled shortly before death and the blood received into about 10 cc. of 3 per cent. sodium citrate in physiological salt solution. It is advised that rabbit's serum which agglutinates rat's blood be added, as was done by BRAUN and TEICHMANN. In 15 to 20 minutes the red blood corpuscles collect together and sink to the bottom and a pure culture of trypanosomes is obtained, but without the addition of the serum the task is much more difficult. The trypanosomes are collected in an agate mortar and dried in a stream of air at a temperature of not above 38 to 40° C. The dried trypanosomes are then triturated to a fine powder, which is used as soon as possible. From one rat not more than 0.05 gm. of the dried substance could be obtained. A weighted portion of powder is taken up with NaCl and injected into the experimental animal, in every case intraperitoneally, the virulent blood being injected subcutaneously in the back. No addition of antiseptic was ever made, as BRAUN and TEICHMANN recommended. By the use of this nagana strain the formation of relapse strains was avoided. The experiments were made with rats, guinea-pigs, and rabbits and the results are summed up in a series of tables.

In the case of rats there was no effect with a less dose than 0.2 gm. of the vaccine; this corresponds with the experience of BRAUN and TEICHMANN. The infective dose was given five days later. It was not found possible to keep the animals alive more than 12 days and none survived. In the guinea-pigs also the author thought that a certain power of resistance developed. LAVERAN and his collaborators believed that toxins were contained in the dried vaccine, though BRAUN and TEICHMANN contested this. Hintze himself thought that the injection of the powder was detrimental to the pigs; the animals got thin and one or two became obviously ill; they died on the 12th to the 14th day without any parasites being demonstrable in the blood, though in the controls they could be easily seen. The spleen was not enlarged. It was difficult to say whether they were immune or had a latent infection because in guinea-pigs parasites are seldom seen

before the 10th or even 18th day. In the case of rabbits no protective action could be made out, even with doses which were double those of BRAUN and TEICHMANN.

*Experiments with Dried Spleen.*—In infected rats the spleen is enlarged to an extraordinary extent and is crowded with trypanosomes. The author thinks it remarkable that the spleen has been so little used for immunisation purposes. In guinea-pigs it is also much enlarged but the size varies considerably. The vaccine was prepared much in the same way as the case of the trypanosomes. The results again are shown in tables. The author thinks that the injection of rat's spleen into guinea-pigs gives a certain amount of protection. One animal never showed parasites and was alive nine months later though it is very exceptional for guinea-pigs to be refractory. Rabbits did not react at all, and the few experiments with rats were not conclusive. Experiments with guinea-pig's spleen did not give definite results, and those with rabbit's spleen gave no result at all.

Experiments with the livers of rats and guinea-pigs introduced intraperitoneally into experimental animals had no obvious result, nor had experiments with the serum of guinea-pigs and rabbits.

The author remarks that the immunity relations in trypanosomes are evidently very complicated. Not all strains are equally valuable in the obtaining of a vaccine. One must expect to meet with special developmental forms [EHRlich and GONDER], relapse strains, and varying power of reaction in the experimental animals. Neither with rats, guinea-pigs nor rabbits did he succeed in protecting animals permanently, and he draws the conclusion that in future experiments larger doses of vaccine must be used.

A. G. B.

LAVERAN (A.). *L'infection par Trypanosoma gambiense chez un maki, un renard, un raton, deux loirs, un meriones et deux gerbilles.*—*Bull. Soc. Path. Exot.* 1915. Dec. Vol. 8. No. 10. pp. 745-751.

Laveran has inoculated *T. gambiense* into animals which are rarely used in the laboratory, namely the lemur, fox, raccoon, dormouse, *Meriones shawi*, and gerbil; he here gives the results, which are summed up in the table. A second lemur was inoculated with *T. rhodesiense* and died on the 6th day. In the case of the fox there were several crises, in which the trypanosomes notably diminished; 32 days after incubation there was cloudiness of one cornea and later of the other; at death both were opaque. The anaemia was profound.

Inoculated with <i>T. gambiense</i> .	Incubation.	Duration.
<i>Lemur mococo</i> .. .. .	5 days	26 days
<i>Canis vulpes</i> .. .. .	10 "	56 "
<i>Procyon hernandezii</i> .. .. .	12 "	31 "
<i>Myoxus glis</i> * .. .. .	3 "	7 "
" " † .. .. .	7 "	22 "
<i>Meriones shawi</i> .. .. .	8 "	31 "
<i>Gerbillus hirtipes</i> * .. .. .	2 "	19 "
" " † .. .. .	9 "	19 "

\* Inoculation intraperitoneal.

† Inoculation subcutaneous.

All the animals became infected and succumbed more or less quickly. In the case of the lemur, the dormice, and gerbil No. 2 the increase of trypanosomes continued steadily till death; in the case of the fox, the raccoon, the meriones and gerbil No. 1 there were trypanolytic crises and trypanosomes were rare at death.

A. G. B.

ERDMANN (Rh.). **Formveränderung von *Trypanosoma brucei* im Plasma-medium.**—*Berlin. Klin. Woch.* 1915. Aug. 2. Vol. 52. No. 31. pp. 812-814.

**The Life Cycle of *Trypanosoma brucei* in the Rat and in Rat Plasma.**—*Proc. Nat. Acad. Sci.* 1915. Oct. Vol. 1. pp. 504-512. With 7 text-figs.

The above two papers relate to the same series of experiments. The following summary is based chiefly on the German version, with some additions from the American paper. An account is given of the behaviour of *Trypanosoma brucei* in a culture medium of plasma. Various strains of nagana were used. A drop of plasma was put in a well on a slide and to this one or more trypanosomes, obtained by OEHLER's method direct from the heart of an infected rat, were added. The preparations were covered, sealed and kept either at 37° C. or at 16° C. to 18° C.

*T. brucei* in rats inoculated subcutaneously first showed after 36 hours. Isolated, broad, enucleate, active organisms were seen. They were not dying forms. After 48 hours, broad, nucleated forms appeared. After 72 to 96 hours, small forms were found. These small forms, according to OEHLER, represent growth forms found at the height of the infection. (Broad forms are considered to be remission forms.) Enucleate, broad forms apparently give rise to flagellates in the organs of the host.

Cell division can be seen in the small form of *T. brucei* in plasma. It takes two hours. If the culture is kept at 37° C., after 24 to 36 hours multiple division occurs. From one *T. brucei*, six to eight round, non-flagellate forms are produced by true schizogony. Each of these elements soon produces a flagellum, a nucleus and blepharoplast being already present. After 3 to 4 days, the flagellum is applied to the rounded body, becomes resorbed and the resistant body of DOFLEIN or the latent body of MOORE and BREINL is produced. [Similar leishmaniform bodies have been described by FANTHAM (1911) and BUCHANAN (1911).] The author considers the rounded forms to be true developmental stages, and successfully inoculated them into rats producing trypanosomiasis resulting in death. [Similar experiments were published by FANTHAM\* in 1911.]

If the culture is kept at 16° C. to 18° C., schizogony rarely occurs, but binary fission ensues. Broad forms cultivated in plasma have the formation of new flagellates retarded. Fragments of lung, spleen or brain from a rat inoculated 24 to 30 hours with *T. brucei*, if kept in plasma at 37° C., produce small flagellates after 2 to 3 days. Lung tissue is particularly favourable for obtaining these flagellates. The correlation by MOORE and BREINL [and FANTHAM] of the latent bodies

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\* *Proc. Roy. Soc.* 1911. Vol. 83. Ser. B. pp. 212-227.

with remission periods of the disease, and of the reappearance of flagellates at times of increased virulence, seems justified by these observations based on cultural experiments.

The author's summary in the American paper is:—

"It is believed that the method employed in these experiments—which is a modification of tissue culture methods and excludes the possibility of the presence of confusing flagellate organisms—affords the means of following, outside the body of the invertebrate host, the sequence of changes in the life of trypanosomes.

"Thus far its use has resulted in the discovery of dimorphic forms, latent or round forms, and crithidia-like forms in *Trypanosoma brucei* outside of the invertebrate host. The crithidia-like forms, when re-inoculated into a rat, give rise to typical *Trypanosoma brucei* from which they had taken their origin."

[The crithidia-like forms mentioned in the summary should not be so styled. They are not like true Crithidia, but are contracting or rounding-up forms, as represented in the author's own illustrations. It is to be regretted that each of these interesting papers is written in a somewhat disconnected manner, and shows an unfortunate lack of knowledge of important recent literature relating directly to the morphology of trypanosomes in mammalian hosts, as has been already indicated.]

H. B. Fantham.

LAMBORN (W. A.). **Second Report on Glossina Investigations in Nyasaland.**—*Bull. Entomol. Research*. 1915. Dec. Vol. 6. No. 3. pp. 249–265. With 3 plates.

A summary of the first Report was published in this *Bulletin*, Vol. 6, p. 174. The observations there described were made in the Proclaimed Area. Since then the author has worked in the neighbourhood of Fort Johnston at the southern extremity of the Lake. As a result of expeditions made here at the close of the rains he concluded that isolated flies were to be found over a very wide range. Such flies he says, are always very unobtrusive and it is probable that they escape the untrained eye. At this season there was nothing approaching a hard and fast line marking the distribution of the fly.

*Proportion of the Sexes.* Like other observers, the author finds that when flies are captured males far outnumber females; he discusses possible reasons for this and appears to attribute it to the necessity for the pregnant female to seclude herself, when once fertilised, from the further attentions of the males. If this is correct, a comparison of the proportionate numbers of the sexes caught during the breeding season, and when breeding is not going on to so great an extent, should be of value. He is sure that the flies in the early dry season (May–June) were breeding more freely than in February when the rains were on, and he gives figures showing that females in February formed 15 per cent. of the total captures and in May, 5 per cent. The numbers on which these percentages are based were 2,052 flies in February and 1,682 in May.

*Predacious enemies.*—A species of dragon-fly, *Orthetrum chrysostigma* Burm., has been found to prey on *morsitans*. This species flits round passers-by and has been seen to capture tsetses in 21 instances.

*Observations on the Larvae of Glossina.*—The observation already made that the newly-born larva is covered with a clear slimy secretion is discussed. As the result of some experiments the author concludes that the secretion is protective against such ants as are usually found in breeding places.

*Parasites of Glossina morsitans.*—A good series of Mutillids (*Mutilla glossinae* Turner) has been bred out from pupae found in the vicinity of Monkey Bay. Several pairs have been kept in jars containing a number of tsetse pupae buried in earth, and the author has watched a female Mutillid ovipositing in one of the pupae. He describes the process at length. These wasps, he finds, can be raised experimentally in some numbers and without any great difficulty. A species of Bombyliid fly has been bred out from *morsitans* pupae, as well as a Chalcid, and an apterous insect, also a Chalcid. The author writes :—

“Examination of the living pupae recently collected, 1,143 in all, affords evidence as to the probable parasitism of a small number, small marks like punctures being visible with a high power lens, and a study of the empty cases found at the same time, numbering 9,762, has afforded some statistics thereon, for owing to their chitinous nature and the sheltered positions in which they are placed it appears to be some time before the empty cases suffer by exposure. By far the greatest number of cases (no less than 8,543) had given exit to perfect flies; for though there is no means of differentiating between normal pupae and those parasitised by Bombyliids, the latter seem to be in so small a minority as to be almost negligible from the statistical point of view; 351, or 3½ per cent., showed that they had been parasitised by Mutillids, the features characteristic of which have already been described, the parasite having in practically every case escaped at the cephalic end; 107, roughly 1 per cent., were intact, except for a pin-point hole at one side, produced in all probability by the escape of some tiny parasite, possibly a Chalcid parasitic on the Mutillid, for a few of these which were broken open showed the remnant of the cocoon of the latter\* ; 264, roughly 2 per cent., show larger rounded holes produced by the escape of a parasite, some at the posterior end, others to one side, the insect being in all probability one of the large Chalcids. Some twenty, a few of which had contained Mutillids, showed evidence that the pupal contents had been eaten from outside; and 477 were so damaged that it was impossible to form any opinion as to their history.”

No parasites have as yet been bred out from the pupae obtained in the Proclaimed Area, which may explain the numerical superiority of *morsitans* in that region.

*Breeding places.* Pupae have been obtained in large numbers. The author finds that the condition of the soil is one of the all important factors. This must be dry at all seasons and contain sand and decaying wood or other vegetable matter so as to make it light. In nearly every instance the breeding places have been situated beneath a fallen and well-decaying tree. They have also been found in cavities in dead limbs of trees and under shelter of overhanging rocks. In the middle of 1914 the Government cleared an area averaging 100 yards in width on either side of the road for a distance of about eight miles from Domira Bay. The author found the flies abundant there and extremely troublesome, though the country was a blackened wilderness as a

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\*“[A large number of these Chalcids were bred subsequently by Dr. Lamborn from a tsetse pupa and proved to be *Syntomosphyrum glossinae* Wirst. There seems little doubt now that this species is harmful, being a hyperparasite of *Mutilla glossinae*.]”



result of grass fires. The tree trunks had been left, some resting at one end on the stump, there being formed beneath an ideal breeding place—used by the fly, as the author was able to show. This proves that it is quite feasible to construct artificial breeding places.

*Flight experiments.* These were continued. They do not seem to add anything to what was previously recorded.

*General observations.* The author has found repeatedly that if well-starved flies with one wing clipped are released in long grass, they will make their way by running to a person sitting at a distance of 10 to 12 feet, from which he deduces that the sense of smell plays an important part in leading them to their prey. The habit which male flies have of settling on one's back, chiefly in the heat of the day, he attributes to the heat of the ground, the flies preferring a cooler situation.

The paper closes with some observations on *Glossina brevipalpis*. On removing the low, thickly-growing vegetation at a spot well sheltered by the foliage of large trees he obtained in the course of two days' search over an area about 25 yards square 507 pupa cases and seven living pupae. This spot was traversed by a path along which game were in the habit of passing. He thinks that the breeding season was over.

Six photographs illustrate the haunts and breeding places of *G. morsitans*.

The paper should be read in its entirety by interested persons.

A. G. B.

SCHWETZ (J.). i. **La limite occidentale de la *Glossina morsitans* dans le Katanga du Nord.**—*Bull. Entomol. Research.* 1915. Dec. Vol. 6. No. 3. pp. 283-288. With 1 map.

ii. **Quelques observations préliminaires sur les mœurs de a *Glossina brevipalpis*.**—*Ibid.* pp. 289-292.

iii. **Preliminary Note on the General Distribution of *Glossina palpalis*, Rob-Desv., in the District of Lomami, Belgian Congo.**—*Ann. Trop. Med. & Parasit.* 1915. Dec. 30. Vol. 9. No. 4. pp. 513-526. With a map.

i. The author refers to the three chief factors which govern the distribution of species of tsetse, as well as the genus, in Northern Katanga [as elsewhere]: climate, vegetation, and distribution of water. He describes the district of Lomami, which though administratively attached to Katanga is marked off from it geologically and botanically. Katanga is characterised by park, Lomami for the most part by savannah intersected by patches and ribbons of equatorial forest. The author notes the confusion into which the terms park, savannah, bush, etc. have fallen, and gives the significance which he attaches to these and similar expressions. He suggests that *palpalis* may be met with anywhere in the equatorial forest where there is water [this is not the experience of others], and that it is not found near water bordered only by reeds [this does not correspond with what others tell us of Tanganyika, e.g., *Sleeping Sickness Bulletin*, Vol. 1, p. 468]. His journeys have shown him that, though *palpalis* is widely distributed, *morsitans* is not found in the Lomami district except on the south-east border where the Katanga "park" joins it.

ii. The author points out that *G. brevipalpis* has certain peculiarities which may lead to its escaping observation unless they are known : it appears only in the evening about sunset, and to a less extent in the early morning, and it does not fly so high as *morsitans* and *palpalis* but flutters near the ground. He has not been able to observe this species except in his travels about the Lomami district. Its place of choice is the paths leading from native villages to the water. It is found in swarms rather than singly. The author has not been bitten, which he attributes to the wearing of trousers and boots ; natives are much bitten on the legs. Like other observers he has not caught more than one female to every hundred males. He has found this species to the west of the Lualaba, which is a new record for it.

A map is attached showing the Lualaba and Lomami rivers and the distribution of *morsitans* and *brevipalpis*.

iii. The preliminary part of this paper corresponds with the French version (i) above. The author states that all his ideas regarding the habitat of *G. palpalis*, chiefly acquired at Tanganyika, were upset by his travels in the Lomami district. He had held previously that all small rivers or streams were exempt from *palpalis* ; now he found the species on insignificant water-courses. He had thought that in marshy places there was no *palpalis* ; now he found it on the "swampy papyrus-covered borders of rivers." Finally he was attacked among "small and insignificant swamps." He proceeds to give instances of what he regards as aberrant behaviour on the part of *G. palpalis*. In each the flies were met with where a steep forested bank met a swamp. In another instance he found them in a wooded swamp near a spring which produced it. The author goes on to consider the difficulties encountered in examining a region for *Glossina palpalis* ; his observations are interesting but contain nothing new. [Nor do some of those concerning the habitats of *G. palpalis*, e.g., see *Sleeping Sickness Bulletin*, Vol. 1, 1909, p. 97. "When a swampy river flows at the foot of a steep hill fly may abound on that bank, if the shade conditions admit." *G. palpalis* has been found in Uganda on quite small water courses.]

A. G. B.

MAGGIO (C.) & ROSENBUSCH (F.). Studien über die Chagaskrankheit in Argentinien und die Trypanosomen der "Vinchucas" (Wanzen, *Triatoma infestans* Klug).—*Centralbl. f. Bakt.* 1 Abt. Orig. 1915. Sept. 8. Vol. 77. No. 1. pp. 40-46. With 2 plates.

The authors give an historical outline of the previous work on Chagas' disease and then an account of the results obtained by the Commission that commenced work in 1911 to determine if the disease existed in the Argentine Republic. The first work was done in the province of Salta [in the north of the Republic], where 13 cases showing symptoms resembling those produced by *Trypanosoma cruzi* were examined. In no case, however, were trypanosomes found in the circulating blood or in subinoculated guinea-pigs. Whether the parasites were present in the internal organs could not be determined.

It was found that in the common bug of Salta, *Triatoma infestans*, numerous flagellates occurred, very like those described by CHAGAS. Two types were distinguishable, one trypanosomic, the other crithidial, while transitional forms were also found.

The trypanosomes in the gut of the bug were  $12\mu$  to  $32\mu$  by  $1\mu$  to  $4\mu$ . The free flagellum was  $2\mu$  to  $4\mu$  long. A large blepharoplast was present, measuring  $2\mu$  to  $2.2\mu$  by  $1\mu$  to  $1.5\mu$  in sectional diameter.

The crithidia showed much variation in form. They were  $8.4\mu$  by  $2\mu$  to  $8\mu$ , the free flagellum was  $2\mu$ , the blepharoplast  $2\mu$  by  $1\mu$ . Rarely forms without a flagellum were present; occasionally some with a flagellum but without a membrane were seen.

The relative frequency of the trypanosomes and the crithidia in the *Triatoma* was investigated. In bugs obtained from the northern provinces of the Republic, the trypanosomes were about half as numerous as the crithidia, when examined at once. If kept in the laboratory, the trypanosomes rapidly dwindle, but the crithidia multiply greatly.

*Triatoma* from the provinces of Salta, Tucuman, Santiago del Estero, La Rioja, Catamarca, Córdoba, Santa Fé, Buenos Aires (N. and W.) La Pampas, contained flagellates. Those obtained from the southern regions of the Rio Negro and Bahia Blanca were free from parasites. It is considered probable that in the lower temperature of the latter regions the trypanosomes did not develop.

In Salta province, 171 *Triatoma* were examined and 71 were infected, that is, 40 per cent. Fifty-nine per cent. of the larvae examined were found to be infected, but only 1.8 per cent. of the nymphs. It is suggested that these young bugs became infected outside the dwellings of the people, and the tatu is suggested as the source.

Two generations of *Triatoma* have been reared in the laboratory, each generation taking one and a half years. Hereditary transmission of the flagellates did not occur. Infection was determined experimentally to be by means of the faeces of infected bugs, the excrement being ingested.

By feeding infected bugs on guinea-pigs and young dogs, only negative results were obtained. On the other hand, when young dogs, guinea-pigs, white mice and young white rats were inoculated subcutaneously or intraperitoneally with the gut contents of infected bugs, infection occurred; 3 to 18 days after inoculation, trypanosomes were found in their blood. These were  $7\mu$  to  $14\mu$  by  $1.5\mu$  to  $4\mu$ . The free flagellum was  $5\mu$  to  $7\mu$ .

In sections of the heart, striped muscle, gut musculature and connective tissue of the salivary glands, parasitic cysts of two types were seen. The first contained leishmania-like parasites, the second trypanosomes. In the endothelium of the lung, schizogony of the leishmania type was seen.

In smear preparations of the bone-marrow some leishmania-like forms, each with a fine flagellum, were found.

Cultures of the peripheral blood, heart muscle, striped muscle and spleen on blood-bouillon and blood-agar gave numerous colonies of round and elongating motionless leishmania forms, which usually produced flagella and became typical crithidia. Subcultures were easy.

The authors conclude that the vinchucas of the north and central Argentine have trypanosomes in their intestines which, if transmitted to animals, are localised in their tissues in the form of leishmania and trypanosome elements, as with *Schizotrypanum cruzi* which, like these, is easily cultivated.

Two plates containing 24 figures illustrate the paper.

H. B. F.

**KRAUS (R.), ROSENBUSCH (Fr.) & MAGGIO (C.). Kropf, Kretinismus und die Krankheit von Chagas.** [Goitre, Cretinism and Chagas' Disease.]-*Wien. Klin. Woch.* 1915. Sept. 2. Vol. 28. No. 35. pp. 942-945.

The authors recount the chief data of the paper summarised above. They point out that it was unfortunately impossible to examine in the Argentine any infants, in whom the acute form of the disease occurs. Of the 13 cases investigated in Salta six were adults with goitre and idiocy, and seven were children between 9 and 13 with goitre. The facts detailed in the previous paper—on the one hand that in certain provinces numerous infected bugs were found and no goitre and on the other in the northern provinces both infected bugs and goitre and cretinism—caused them to subject to analysis the relations indicated by CHAGAS between goitre and the Triatoma.

It is first noted that CHAGAS' work was done in a hilly region of Brazil (Minas de Geraes) and not in the Brazilian plain where infected bugs are also found. Moreover when a new disease is being described, similar in its symptomatology to endemic goitre and cretinism, patients should be examined in districts where these conditions are wanting or are at least rare, if no confusion is to result. Reference is made to the work of CARINI and MACIEL [this *Bulletin*, Vol. 3, p. 534]; they showed that infected bugs are widespread in the province of San Paulo, Brazil, but give no data of the number of human cases. They were able to produce infection in one guinea-pig only, but come to the conclusion that the disease in man is common.

The authors then attack the question whether it is possible clinically to differentiate between endemic goitre and cretinism on the one hand and Chagas' disease on the other, and whether the parasitological findings of CHAGAS are sufficiently constant for such a differentiation. It is obviously difficult to separate the diseases in the chronic form. In the acute form CHAGAS believed it possible because the infected infants were fed exclusively at the breast and did not drink water; the authors point out that goitre and cretinism in the infant are often the result of goitre in the parents, and relate some experiments made by KRAUS and others on goats. In the chronic cases diagnosis could only be reached as a result of inoculation of 5-10 cc. of blood into animals, and it is noteworthy that in the lungs of these intracellular forms of parasites were found of the type of *Pneumocystis* and not of *Leishmania*, as in the case of the acute forms; but recent investigations have shown that *Pneumocystis* forms occur in the life cycle of a parasite quite different to *T. cruzi*.

CHAGAS pointed out differences between the goitre of Europe and that of Minas Geraes, which he believed enabled one to distinguish between the two affections; the present authors dispute his points and believe that such a differentiation is almost impossible. They conclude that the existence of a chronic disease, caused by *T. cruzi* and accompanied by goitre, myxoedema, idiocy and diplegia, has not been satisfactorily demonstrated.

Returning to the Argentine they state that in some districts between 60 and 70 per cent. of the population suffer from goitre. It will be necessary to make autopsies on a number of cretins to ascertain whether this is Chagas' disease or endemic goitre and cretinism. They

themselves will look in those provinces in which there is no endemic goitre, but infected bugs are found, for patients with the symptom-complex of chronic Chagas' disease.

Similar investigations should be made in Brazil, and in both countries experiments should be made in goitrous districts, with animals and water, to exclude this factor.

They add that, even if their views should receive confirmation, CHAGAS' discovery will not lose in merit.

A. G. B.

**TORRES (Magarinos).** *Alguns fatos que interessam á epidemiologia da molestia de Chagas.* [Some Facts bearing on the Epidemiology of Chagas' Disease.]—*Mem. Inst. Oswaldo Cruz.* 1915. Vol. 7. No. 1. pp. 120–138.

A paper of a controversial nature mainly directed to contradicting the assertions of BRUMPT to the effect that *T. cruzi* develops in *Cimex rotundatus* and other bugs, and that cannibalism among the larvae of *Triatoma megista* assists in propagating the trypanosome [this *Bulletin*, Vol. 1, p. 670 and Vol. 5, p. 102]. By investigations of his own, carried on in the houses of infected persons, the author finds that the sucking of infected vertebrates (human beings and cats) by larvae and imagoes of *T. megista* is the only way in which Chagas' disease is propagated. The larvae of *T. megista* certainly have the habit of feeding on one another, but the fluid which they withdraw is not blood from the alimentary canal, but the colourless fluid from the body-cavity which never contains trypanosomes. BRUMPT's idea that the faeces of the *Triatoma* are the means of carrying disease, and that their deposit on the skin of the vertebrate host is one of the means of introduction, is also held to be erroneous. The hereditary transmission of the trypanosome through the eggs of the *Triatoma* is also denied.

Incidentally it is mentioned that certain armadilloes (*Tatus novemcinctus*, *Dasypus sexcinctus* and *D. unicinctus*) harbour *Trypanosoma cruzi*, even far from the habitations of men, the transmissor being a species of *Triatoma* (*geniculata*) which inhabits their burrows. The author seems to have carried out his investigations very carefully.

J. B. Nias.

**LAVERAN (A.).** *Au sujet des Trypanosomiases équine du Maroc.*—*Bull. Soc. Path. Exot.* 1915. Oct. Vol. 8. No. 8. pp. 576–578.

Laveran briefly summarises the accounts of trypanosome infections in horses in Morocco given by VELU; SERGENT, LHÉRIETIER and BELLEVAL; and FIORI and M. and Mme. DELANOË [see this *Bulletin*, Vol. 5, p. 414, and Vol. 6, pp. 376 and 377]. He himself has received blood preparations containing trypanosomes from a veterinary surgeon at Rabat. There is evidently a widespread and serious equine epizootic in Morocco. This paper is devoted to a discussion of the species to which this trypanosome should be assigned, with a view to proper prophylaxis. He has examined some of DELANOË's preparations, and has noted many trypanosomes without free flagellum; he suggests this may be the trypanosome of mbori, a variety of surra. He concludes that the trypanosomes of Moroccan horses are of two types: one monomorphic, the other dimorphic or polymorphic.

A. G. B.

- i. VELU (H.). **La Trypanosomiase des chevaux du Maroc. (Etude clinique).**—*Bull. Soc. Path. Exot.* 1915. Nov. Vol. 8. No. 9. pp. 647–650. With 1 chart.
- ii. SERGENT (Edmond), SERGENT (Etienne), LHÉRITIER (A.) & BÉGUET (M.). **Comparaison entre le *Trypanosoma soudanense* et le *Trypanosoma berberum*.**—*Ibid.* pp. 650–653.
- iii. SERGENT (Edm.) & LHÉRITIER (A.). **Longue incubation ou latence d'infections à trypanosomes chez des chiens inoculés avec des virus provenant de chèvres.**—*Ibid.* pp. 653–655.

i. The symptoms of trypanosomiasis in horses in Morocco are those of all the trypanosome infections of long duration, but oedema is very rare. The onset is insidious. When the disease is not fatal, convalescence is very slow.

ii. In 1907, as a result of immunity experiments made in France, LAVERAN concluded that *T. soudanense*, originally from the Upper Niger, and the trypanosome of the Algerian debab were identical. In 1912 three of the authors made similar experiments in their turn and as a result created for the trypanosome of debab the name of *T. berberum*. Later LAVERAN as a result of a crossed immunity experiment maintained his former conclusion [see this *Bulletin* Vol. 3, p. 254.] The present experiments were undertaken in Algeria with LAVERAN's *T. soudanense* strain and a strain of debab obtained from camels in Sud-Constantinois; three goats firmly immunised against *T. soudanense* contracted a strong and lasting infection with debab. The protocols are given. Moreover, these experiments were done in the reverse direction to their former ones. They conclude that the debab virus is specific and should be known as *T. berberum*, Edm. et Et. Sergent et A. Lhéritier 1912.

LAVERAN, discussing the paper, said that his former conclusions seemed to him quite justified. He suggested that the authors might have used a different strain of debab or that the *T. soudanense* had been modified by its long passage through guinea-pigs.

iii. A dog inoculated from a goat infected with *T. marocanum* showed an incubation period of nearly three months, another over seven months; one infected from a goat with *T. berberum* eight months. The dogs were examined thrice a week. The disease develops in the same way after these long incubations as after short ones.

LAVERAN said these cases were in his experience quite exceptional. In 15 years he had never seen them. When the presence of trypanosomes is very difficult to establish, autoagglutination of the red blood cells is a valuable sign.

A. G. B.

- MACFIE (J. W. Scott). **A Note on a Trypanosome of the Black Rat (*Epimys rattus*).**—*Ann. Trop. Med. & Parasit.* 1915. Dec. 30. Vol 9. No. 4. pp. 527–534. With 1 plate.

The trypanosome was found in the blood of a young black rat, *Epimys rattus*, in Accra. The parasites were of the *T. lewisi* type, but were polymorphic, and some were large with a prolongation of the posterior end in a whiplike manner. Their movements are described. One hundred parasites were measured and varied between

15 $\mu$  and 48 $\mu$ , averaging 30 $\mu$  in length. They were usually about 2 $\mu$  broad, but some attained 6 $\mu$  in breadth. In other preparations the extreme limits of length were 12 $\mu$  and 52 $\mu$ . Various types of the parasites are described and their dimensions given. They are compared with *T. eburneense*, Delanoë, 1915 [see this *Bulletin*, Vol. 5, p. 302], and are like the *T. longicaudense*, Lingard, 1906 (which is really a form of *T. lewisi*). It is possible that trypanosomes of the type *T. eburneense* may be varieties of *T. lewisi*.

H. B. F.

FRANÇA (Carlos). *Le Trypanosoma inopinatum*.—*Arch. f. Protistenk.* 1915. Oct. 8. Vol. 36. No. 1. pp. 1–12. With 1 plate.

The trypanosome studied occurs in frogs and is transmitted by the leech *Helobdella algira*. *Trypanosoma undulans* is the adult form of *T. inopinatum*. It (*T. undulans*) may be cultivated in blood between coverslip and slide and crithidial stages ensue. Such crithidial forms when inoculated into a clean frog intraperitoneally can infect the frog, and small trypanosomes (like *T. inopinatum*) are seen on the 14th day. Intermediate types, formerly called *T. elegans*, appear in about six days. The dimensions of the various forms are given. In the case of another inoculation of a frog with cultural *T. undulans*, infection resulted on the 12th day, and in 15 days large numbers of *T. inopinatum* occurred. The next day the frog was killed when it was actually dying, and a third frog inoculated from it. Leishmaniform stages were found in the lung, spleen and liver. Most of these leishmaniform parasites are considered by the author to be evolutionary, and they multiply actively. Also, rounded forms were seen in mononuclear leucocytes and these are not all being phagocytosed.

The author considers these non-flagellate forms to represent transition stages between crithidial forms of the invertebrate host, and the first generation of trypanosomes in the vertebrate host.

*Pneumocystis carinii* was seen, and the discovery of *Pneumocystis cucinuli* in a sick rabbit is recorded.

Crithidial forms obtained from the leech *Helobdella* were inoculated into clean frogs and produced infection on the 17th day.

Inoculation of parasites of the type *T. inopinatum* into a frog results in infection on the 8th day.

The author's main conclusions are :—

There is an ontogenetic relation between *T. inopinatum*, *T. elegans* and *T. undulans*.

The name of the trypanosome is *T. inopinatum* Sergent; *T. undulans* França and Athias, *T. elegans* França and Athias, and *T. hendersoni* Patton become synonyms.

The trypanosome is parasitic in *Rana esculenta* and *R. temporaria* in Europe and Africa, and in *R. hexadactyla* and *R. tigrana* in India.

The infection by *T. undulans* (adult form of *T. inopinatum*) continues for a long time and is usually intense.

In frogs parasitised by this trypanosome for many months, rare forms of multiplication are found in the spleen. Some of them recall the first forms seen in cultures.

These forms are rounded or elongated and possess a certain number of nuclei and blepharoplasts. They are not found in other organs.

Multiplicative forms found in the organs in small numbers in chronic infections appear to assure an infection of a certain intensity, which, however, is not usually injurious to the life of the animal.

On the other hand, during the early stage of infection, when the youngest forms of the parasite (*inopinatum* form) are present in the blood, the animal often succumbs to the infection. These young trypanosomes multiply very actively by binary fission or by rounded non-flagellate forms, and produce such intense infections that the host dies.

Dividing forms are not found in the circulating blood, but if frogs containing the adult form of *T. inopinatum* (*T. undulans*) are kept at a temperature of 22° C., modification of the form of the trypanosome is assisted. They become shorter and show a rounded posterior extremity. Forms showing longitudinal division then appear in the circulating blood.

H. B. F.

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## RELAPSING FEVER.

LEVY (FRITZ). **Beobachtungen über Rückfallfieber.** [Observations on Relapsing Fever.]—*München. Med. Woch.* 1915. Sept. 14. Vol. 62. No. 37. pp. 1264–1265. With 3 text-figs.

The paper contains an account of an epidemic of relapsing fever observed in the hospital at Lügumkloster. Seventy-six persons were found to be infected with blood spirochaetes in one month. They presented the typical symptoms of relapsing fever. During the apyretic periods, very few spirochaetes were found in the blood of the patients. Chronic cases of relapsing fever were observed. Cases of mixed infection with typhus and spirochaetosis were found.

Staining the spirochaetes with carbol-alcoholic gentian violet was recommended.

Oedema was present in some of the cases, but it is suggested that it was due to beriberi or avitaminism. The differential diagnosis from malaria and typhus is given.

A. Porter.

CAYET. **Beitrag zur Differentialdiagnose des Rückfallfiebers.**—*München. Med. Woch.* 1915. Oct. 5. Vol. 62. No. 40. pp. 1366–1367.

This paper contains an account of the case of a man who, after presenting symptoms of several diseases, was found to be infected with *Spirochaeta recurrentis*. The patient first showed symptoms diagnosed as pneumonia, then as acute lung infiltration. Later high fever with abdominal symptoms like appendicitis appeared. Miliary tubercle was next diagnosed and then symptoms suggestive of typhoid fever were noted. No typhoid indications were obtained from the blood or the faeces. After six weeks' observation, *Spirochaeta recurrentis* was found in the blood of the patient. He was treated with neosalvarsan intravenously and made a rapid recovery.

A. P.

REICHE (F.). **Rekurrenserkrankungen und ihre Behandlung mit Salvarsan.** [Relapsing Fever and Its Treatment with Salvarsan.] *München. Med. Woch.* 1915. Oct. 5. Vol. 62. No. 40. pp. 1347–1348.

An account is given by the author of an epidemic among Russian prisoners. Thirty-six were examined, and twenty-one were found to be suffering from relapsing fever. Some cases were complicated by tertian malaria and filaria. All the patients were much exhausted. Icterus was shown by some. The urine of others contained bilirubin, urobilinogen and also urobilin. Fourteen patients showed oedema of the extremities, and the muscles of the leg were very sensitive to pressure. Three cases showed pleural complications; twelve others had bronchitic symptoms and of these, two presented large broncho-pneumonic foci. One of the last mentioned cases had blood-stained sputum, in which spirochaetes were found.

The patients were treated with salvarsan intravenously, 0·3 grams being given. The spirochaetes disappeared from the blood in twenty-four hours, as a rule. One case still harboured spirochaetes after ten days and was given an intramuscular injection of one per cent. antimony tartrate solution. Some of the patients were under observation up to 78 days without a recurrence of relapsing fever.

A. P.

VON KORCZYNSKI (L. R.). **Rückfallfieber.** — *Med. Klinik.* 1915. Sept. 19. Vol. 11. No. 38, pp. 1049-1051; Sept. 26. No. 39. pp. 1075-1078.

An account is given of the epidemic of relapsing fever in Sarajevo and neighbouring parts of Bosnia during 1914-15. Previous epidemics are stated to have occurred in 1887-89 and 1902-4. The epidemic now under consideration is said to have been introduced by Serbian troops, especially irregulars, and the author considers that the disease is transmitted by vermin, especially bugs. During the early months of 1915, only two out of the 75 cases of relapsing fever died. Neosalvarsan was found efficacious.

The paper deals largely with the statistics of the epidemic and the following points appear to be of general interest. An herpetic eruption was present in 12 per cent. of the cases, acute hyperaemia and catarrhal inflammation of the conjunctiva in 17·3 per cent., rhinitis and pharyngitis in 12 per cent. and bronchitis in 36 per cent. Albuminuria was present in 17 cases but did not last longer than the pyrexial period. Details of other symptoms occurring in certain cases are also given. Differential leucocyte percentages of six cases are set forth, and it is noted that eosinophiles are absent from the peripheral blood. The duration of the febrile periods and the number of relapses found by various observers, chiefly German, since 1878 are compared. In 76 per cent. of the cases of the present epidemic there was only one relapse, and of the remaining cases none had a third relapse. The first febrile period averaged 5·7 days, the second 2·9 days, the apyrexial period averaged 10·9 days.

After the intravenous injection of salvarsan, the crisis was hastened and ensued in 6 to 18 hours. A dose of 0·45 to 0·6 gram of salvarsan was usually sufficient for children, but up to 0·9 gram was used for adults. Full details of two of the cases treated are given. It may be necessary to support the heart by the use of suitable stimulants.

A. P.

LURIE (G. A.). **Notes on "Castellani's Bronchospirochaetosis," with Report of a Case.** — *Jl. Trop. Med. & Hyg.* 1915. Dec. 1. Vol. 18. No. 23. pp. 269-271. With 1 fig.

**Note sopra la Bronchospirochaetosis di Castellani.** — *Riv. Crit. Clin. Med.* 1915. Nov. 20. Vol. 16. No. 47. pp. 653-655.

While working in Serbia, the author, who was attached to the American Red Cross Sanitary Commission, observed a case of bronchial spirochaetosis. He fully confirmed the recent observations of FANTHAM [see this *Bulletin*, Vol. 6, p. 211], and the earlier ones of CASTELLANI.

He found the spirochaetes to vary from  $5\mu$  to  $30\mu$  in length and  $0.2\mu$  to  $0.6\mu$  in breadth. Thin, thick, long, short and intermediate types are distinguished. The organisms mostly possessed tapering ends. A membrane or "crista" was seen in some specimens. The existence of a coccoid stage in the life-history of the organism was confirmed, "strings of coccoid bodies with spiral outline" having been seen.

The patient was a Greek lady, aged 24 years, resident at Uskub. Her expectoration was rather scanty and muco-purulent. CASTELLANI personally confirmed the diagnosis. Arsenic was administered in the form of liq. Fowleri and pil. glycer. co. of the U.S.A. Pharmacopoeia.

A. P.

COLES (Alfred C.). **An Easy Method of Detecting *S. pallida* and other Spirochaetes.**—*Brit. Med. J.* 1915. Nov. 27. p. 777.

The method used by the author for the detection of spirochaetes, such as *S. pallida*, consists in examining a dry stained film of the organisms with dark-ground illumination. The stains usually employed were those of Giemsa or Leishman. The film was unmounted. The dark-ground illumination was secured by the use of an ordinary achromatic condenser, used dry, and provided with a Travis's expanding stop below it. The author used an 8mm. or  $\frac{1}{2}$  in. objective of Zeiss or Leitz and a compensating ocular of 8, 12, or 18, or an ordinary No. 4 or 5 eyepiece. A long tube microscope is necessary. *S. pallida* is stated to stand out "as a beautiful golden spiral, which cannot be missed by the merest tyro." Further, "the large field of vision, the ease with which a slide can be thoroughly examined, the absence of any eye-strain, and above all the remarkable way in which the spirochaete strikes the eye, have only to be seen to be appreciated."

A. P.

DRAKE-BROCKMAN (R. E.). **Some Notes on the Bionomics of *Ornithodoros savignyi* in British Somaliland.**—*Bull. Entomol. Research.* 1915. Sept. Vol. 6. Pt. 2. pp. 195-196.

As this tick is responsible for the transmission of relapsing fever in Somaliland the author's notes are of additional interest.

The tick is most abundant in the dusty soils surrounding wells and waterholes, but also frequents most camps of long standing. It usually burrows to a depth of half to one inch, lying dormant until the ground is disturbed. It then emerges and moves about until it finds its victim, when it commences to feed almost at once; it seldom climbs higher than the ankles in human beings and the hocks in animals. The tick will feed on human beings, cattle, ponies, mules, donkeys, sheep and goats with equal vigour.

In confined areas, where these parasites swarm, the best method of destroying them is to rake over the surface and then light brushwood fires over the ground. Antiseptics are practically useless but turpentine is fatal to the tick and therefore the author recommends that when entering a locality where the ticks are abundant the feet and ankles should be rubbed with turpentine.

E. Hindle.

## TROPICAL DISEASES OF THE SKIN.

CHALMERS (Albert J.) & MACDONALD (Norman). *Trichophyton violaceum* var *Khartoumense*.—*Jl. Trop. Med. & Hyg.* 1915. July 1. Vol. 18. No. 13. pp. 145-147. With 1 plate and 1 diagram.

This is the fifth of a series of communications on "*Tinea capitis tropicus*" in the Anglo-Egyptian Sudan. The authors have met with only one case, that of a young Sudanese girl living in Khartoum. An elaborate historical account is given of this form of *Trichophyton* since its discovery by SABOURAUD in 1892. The fungus in the authors' case is an endothrix, and culturally it liquifies gelatine. They believe it to be a distinct variety, and have named it "*Trichophyton violaceum* var. *Khartoumense*" (Chalmers and Macdonald, 1915). It is distinguished by the following characters: (1) It showed no sign of any ectothrix stage, which therefore must be more or less transient; (2) In very old patches it showed no sign of inflammation; (3) Its cultures on maltose and glucose agar appear to differ slightly from SABOURAUD's typical illustrations; (4) It liquifies gelatine, which has not so far been described in any other variety of *T. violaceum*. As, clinically, the appearances are the same as with *T. currii* the diagnosis must be determined by cultures.

The treatment adopted was by tobacco soap.

The paper is illustrated by photographs of the child's scalp, and of cultures and subcultures on various media.

P. S. Abraham.

ESCOMEL (Edmundo). **La Blastomicosis Humana en el Peru y Bolivia.** [Human Blastomycosis in Peru and Bolivia.]—*Cronica Med.* 1915. July. Vol. 32. No. 625. pp. 149-172. With 8 figs.

An account of two cases of a blastomycotic infection of the mouth and palate, due to a blastomycete or yeast fungus, which was successfully isolated and cultivated. The condition is remarkable for its long duration and refractoriness to any other treatment than extirpation by cautery. The initial lesions generally occur on the skin, the lobe of the ear being a favourite site, but the disease quickly attacks the region of the naso-pharynx, and is then practically beyond treatment. The two patients, whose cases are described at length, were both men, one being aged 45 and the other 50. Both had lived for a considerable time in the forest region of Peru. The initial lesion showed itself in the first case in the shape of an ulcer on the right arm, which was extirpated by the author with the actual cautery. This was followed by another ulcer in the same region, which was similarly treated. Two years then passed without further symptoms, but at the end of that time an ulcer, two centimetres in diameter, appeared on the soft palate. Treatment for this was declined and the patient passed from under observation for the time being. Ten years later, a similar ulcer appeared on the gluteal region which caused great inconvenience in riding, and this led to the patient seeking medical advice once more. The palatal lesion had by this time extended to the tonsils, faucial pillars, gums and borders of the larynx, and consisted of an irregular rugose ulceration with undermined edges, covered with yellow or greenish mucus. In the ulcerated tissue were

embedded a number of yellow nodules, consisting of masses of yeast-like cells, surrounded by inflammatory tissue. The general condition of the patient was not so bad as might be expected, the chief symptom complained of being profuse salivation. A variety of treatments, including injections of salvarsan, were employed without effect.

In the second case, the symptoms had lasted for 20 years, having commenced with nasal irritation, which was followed by ulceration of the lips and the lobe of the left ear. An inspection of the buccal cavity showed loss of the uvula and ulceration of the tonsils, fauces and inner surface of the cheeks. The external disfigurement was considerable, as shown in the photograph of the patient. Treatment also in this case was quite without avail.

The fungus isolated showed identical characters in both cases and was cultivated with ease on a variety of saccharine media, and on carrot, at a temperature of 15–20° Cent. It exhibited no tendency to form mycelia and was therefore a pure yeast, propagating solely by budding. In the tissues it formed the centre of the yellow nodules already described, being surrounded by granulation tissue. For further details the original paper should be consulted. A few inoculations into guinea-pigs were tried; the animals survived, presenting on post-mortem examination nodules in the liver and spleen.

The condition described must be carefully distinguished from other similar lesions of the same parts which are found in the same regions of the world. Such are (1) Cuchi-pe or Pian, due to "*Treponema pallidum*" Castellani, (2) ordinary syphilitic ulcerations, (3) buccal leishmaniasis, (4) other blastomycotic affections of the mouth, such as the Busse-Bushke and those caused by the *Cryptococcus corseili* and the *Cryptococcus primmeri*, and finally the Zymonematosi of Brazil, described by LUTZ (*Brazil Medico*, 1908) and SPLENDORE (*Rev. Soc. Med. d. San Paulo*, 1909).

J. B. Nias.

WADE (H. Windsor). **Symposium on Blastomycosis. I. On the Bacteriology and Pathology of the Blastomycotic Infections.**—*New Orleans Med. & Surg. J.* 1915. Nov. Vol. 68. No. 5. pp. 287–293. With 1 plate.

In this illuminating introductory paper the author points out that blastomycosis is most frequently confined to the skin; systemic infection is rare. Most cases of the latter reported in America have occurred in the neighbourhood of Chicago. During the past year, however, five cases of the generalised disease have died at the Charity Hospital in New Orleans and two other cases have been known in private in this district. Clinically, the systemic disease is not easy to diagnose; the cases are usually taken for tuberculosis—the microscope is essential for the diagnosis. The growth of the fungus in the tissues and exudates differs markedly from its growth in culture media. In the former, the organisms, of the size of a leucocyte or larger, are single-cell bodies with a double-contoured highly refractive outer membrane or shell which resists the digestive action of antiformin or 20 per cent. potassium hydroxide, and they can thus be recognised in sputum etc. The membrane particularly shows up well as clear blue rings around red-stained granular protoplasm, by Mallory's aniline-blue connective-tissue stain in Zenker-fixed tissues.

Multiplication of the organisms in the tissues takes place by a budding process typical of yeast cells—a distinctly different method of reproduction from the intracellular sporulation of the organisms of the “*coccidioidal granuloma*” of the Pacific Coast.

In artificial cultivations, on the other hand, a mycelial “cottony” growth takes place.

In contrast to the coccidioidal organism, the virulence or pathogenicity of the blastomycete is comparatively low; it is easy to cultivate it artificially but difficult to produce a lesion with it in the ordinary laboratory animal; lowered resistance by poor diet, previous lesions, inoculations of considerable numbers of organisms and perhaps repeated inoculations may be necessary.

Pathological points of importance in this disease are:—(1) the frequent resemblance of the lesions to those of tubercle; (2) the great range of possible lesions and their multiplicity; (3) the tendency to abscess formation; (4) the frequency with which bony structures are attacked; and (5) the epithelioma-like reaction of the epidermis. Many blastomycotic skin lesions have no doubt been mistaken for “epidermoid carcinoma” and the cure of the latter credited to excision.

Quoting an unpublished report of Dr. HURLEY of Kansas City, in 21 autopsies of blastomycosis patients, 20 showed lesions of the skin, 20 of the lungs, 13 of the bones, 12 of the spleen, 8 of the brain; kidneys 7; lymph glands 6; prostate 4; pleura 4; pancreas 3; spinal cord, epididymis, pericardium and heart 2 each, and the testicle, larynx, eye and appendix one each.

**BEL (George S.). Symposium on Blastomycosis. II. Medical Aspects of Systemic Blastomycosis.—*Ibid.* pp. 293–298.**

Dr. Bel emphasises the difficulty of diagnosing systemic blastomycosis unless cutaneous evidences are present. He refers to BUSSE's discovery in 1914 [? 1894] of a fatal infection caused by a yeast.

The cases of systemic disease he has met with have been chiefly in young men involved in hard work and with unhygienic surroundings. The respiratory tract seems to have been the chief point of entry as STROBER thinks, although MALLORY and others believe that the infection always begins in the skin. The tissues of predilection are the skin, lungs and bone; the illness generally beginning with a cold, cough with expectoration, pain and fever of septic type. The essential fact in the diagnosis is the presence of blastomycetes in the exudates and tissues affected. Quoting STROBER, the disease must be distinguished from (1) “*Coccidioidal granuloma*,” in which the nodular lesions more closely resemble those of tubercle with greater tendency to lymph gland infection, the cutaneous lesions are more ulcerative, the average duration of the disease is shorter, and the reproduction of the organism is by endosporulation. (2) *Epithelioma*, in which the growth is slower, with greater marginal induration, without the bluish-red surrounding halo in which are seen characteristic small blastomycete-containing abscesses. (3) *Tuberculosis*: in pulmonary cases the clinical differential diagnosis is difficult; tubercle is perhaps more destructive, cavity formation and marked haemoptysis more common; the microscope will decide. (4) Syphilis-complement-binding tests may be necessary if any doubt exists, and blastomycete vaccine reactions may be tried.

The prognosis of systemic blastomycosis is extremely grave; the average mortality has been stated to be 90 per cent.

As regards treatment, large doses of potassium iodide have given the best results, and X rays and a blastomycete vaccine are suggested.

**MENAGE (H. E.), Symposium on Blastomycosis. III. Cutaneous Blastomycosis.—*Ibid.* pp. 299-300. With 1 plate.**

According to the author a fully developed case of blastomycosis of the skin with the characters undisturbed is usually easy of diagnosis even without the microscope. He refers to the first case observed in America by GILCHRIST, as well as to the descriptions of the disease published by HYDE, MONTGOMERY and ORMSBY of Chicago. It generally begins as a small purplish-red papule about the size of a pea, which soon becomes covered with a crust. This grows into an elevated papillomatous patch, the papillae bleeding readily with the formation of small blood-crusts, which give the appearance of the growth having been sprinkled over with black pepper. The border of the diseased area sloping down to the normal skin is dark or purplish red and is the seat of numerous miliary abscesses containing a glairy secretion becoming pustular, and with almost pure cultures of the blastomycetes.

The lesions are principally situated on the hands, arms and face, where most exposed to infection, but they may appear anywhere on the skin and mucous membranes.

Seventy-five per cent. of the cases have occurred in men, mostly over 40 years of age.

The case presented to the meeting was a negro aged 55, with a duration of illness of four years. He had recently been under treatment with X rays for three months with excellent results. The photograph before treatment shows a very extensive hypertrophic papillomatous growth involving the greater part of the face; the second photograph shows the face to be practically clear of the disease.

**MATAS (Rudolph). Symposium on Blastomycosis. IV. Remarks on the Surgical Aspects of Systemic Blastomycosis.—*Ibid.* pp. 301-309.**

The author admits that surgery can only cure blastomycosis when the lesions are local and accessible.

He discusses the relation of coccidioidal granuloma to blastomycosis and quotes RENFORD, P. K. BROWN, CUMMINS, STOBBER and several other writers on the subject.

As regards the treatment of blastomycosis, he attaches great importance to prophylactic measures, proper ventilation, sunlight, drainage, prevention of damp which favours mould, removal of decaying or mouldy wood or vegetable material, etc. Potassium iodide in large doses is beneficial although of little use in systemic cases, and a total failure in coccidioidal infection. X rays, as seen in Dr. MENAGE's case, are often curative for local and superficial lesions. Accessible surgical lesions should be treated promptly and radically by excision, iodides and X rays; abscesses drained and disinfected; and diseased bones and joints excised when possible.

P. S. A.

HILDRETH (E. R.) & SUTTON (A. C.). **Oldiomycosis in Porto Rico.**—*Jl. Amer. Med. Assoc.* 1914. Dec. 26. Vol. 63. No. 26. p. 2289.

While about 150 cases have been recorded this is the first noted in Porto Rico. The diagnosis was made from fresh specimens of pus in 10 per cent. sodium hydroxide solution, and from stained smears. The pus contained numerous doubly-contoured oval and spherical bodies, highly refractive and 10 to 15 microns in diameter. The patient, aged 40, seen in July 1914, native of San Juan, complained of painful lumps on his legs, the first nodule having appeared in May on the outer part of the leg four inches below the knee, and a month later others appeared. They began as small painful lumps beneath the skin, increasing in size to about an inch in diameter and softening in the centre. The skin over all of them was of a deep purple. The inguinal glands on both sides were distinctly palpable. The patient had had attacks of pain in the chest every two or three months for the past two or three years. There were no marked physical signs in the chest except slight dulness at the left base. Expectoration had ceased and the sputum was never examined.

The nodules showing fluctuation were incised and drained with iodoform gauze, and the punched out ulcerated surfaces so formed dressed with perchloride solution. The other nodules were treated with ichthyol ointment, and iodide of potassium in increasing doses given internally. All symptoms disappeared in six weeks.

P. S. A.

TORRES (Octavio). **Considerações sobre a pedra, acompanhadas de algumas observações, e seu tratamento.** [Notes on Piedra and its Treatment.]—*Brazil Med.* 1915. Sept. 22. Vol. 29. No. 36. pp. 282-285.

A report on 14 cases of piedra successfully treated with a 5 per cent. solution of salicylic acid in absolute alcohol. The hair is either sponged with the solution after a bath, or is combed with a comb dipped in the solution. The alcohol evaporates and leaves the salicylic acid in intimate contact with the nodules in the form of powder. This treatment is particularly suitable in the case of women who object to cutting the hair short. The parasite has been very completely described in a monograph by P. HORTA, of the Institute Oswaldo Cruz.

J. B. N.

DAMOND. **Otomycoses en Cochinchine.**—*Far East Assoc. Trop. Méd. C. R. Trois. Congrès Biennal, Saigon* (1913). 1914. pp. 283-285.

Otomycosis appears to be common in Cochinchina. Of 42 cases of external otitis treated in seven months at the hospital in Saigon 18 were of mycelial origin. The fungus (*Aspergillus*) was most frequently found in meati, free from cerumen, etc., forming greyish-white masses adhering to the surface, and in old and acute cases contracting the canal and destroying the tympanum.



The author considers iodine vapour the best cure, after removing the masses with hydrogen peroxide solution and pincers or probe. Many of the patients attributed their disease to water getting into the ear in bathing.

In the discussion on this paper Dr. Campbell HIGHT (Siam) referred to a paper of his on the subject 18 years ago and stated that he had frequently observed the affection in people who had been recently bathing in the sea. He advocated clearing away the fungus and frequent antiseptic douches or syringing with hydrogen peroxide.

Dr. MONTEL always employed nascent iodine, first injecting five drops of a dilute solution of sodium iodide and immediately afterwards five drops of 12 vol.  $H_2O_2$ .

P. S. A.

ESCOMEL (E.). *Sur un nouveau cas d'Actinomycose au Pérou.*—*Bull. Soc. Path. Exot.* 1915. Oct. Vol. 8. No. 8. pp. 571-573.

The author in 1914 reported the first case of actinomycosis observed in Peru. A second has recently occurred, also in a railway man who handled dried ox hides, the infection in both cases being through the respiratory channels.

For two years the patient had complained of cough, but nothing definite was discovered. He then began to spit blood, but with no tubercle bacilli in the sputum. Painful polyarthritides of all the limbs then ensued, subsiding under treatment, but with continuance of frequent hæmoptysis. Persistent pain and swelling then appeared over the left shoulder blade, the tumour growing and invading the axilla. Actinomycosis was suspected, but repeated examinations of the blood and sputum were negative. One day there was copious vomiting of red pus, after which the tumour diminished and almost disappeared. The sputum subsequently showed numerous grains of the actinomycosis fungus. The disease progressed, with much general emaciation and irregular fever, until the patient died.

P. S. A.

i. JOUENNE. *Un cas de mycétome à grains rouges.*—*Bull. Soc. Path. Exot.* 1915. Nov. Vol. 8. No. 9. pp. 623-624.

ii. HECKENROTH (F.). *Au sujet des grains rouges d'un mycétome.*—*Ibid.* pp. 624-628.

i. A native of Senegal appeared with a tumour 23 cm. high and 73 cm. in circumference behind and on the inner side of the right knee, slightly painful on walking. It commenced a year previously, without any history of injury. His general health was not affected. Over the surface of the growth were numerous small irregular ulcerations with slightly bloody exudation which contained numbers of red grains. Between the ulcerations were small violaceous tumefactions of the skin, containing serous fluid with red grains.

ii. The author alludes to the works of LAVERAN, THIROUX and PELLETIER, and PINOY, and gives a description of the "red grains" obtained in the case of Dr. JOUENNE recorded above.

The grains are of irregular shape and size, some visible to the naked eye, others  $\frac{1}{8}$  to  $\frac{2}{3}$  of a mm. in their greatest diameter. They are relatively hard in consistence, but can readily be crushed into fragments. When suspended in water they are of a pale rose colour, but darker when seen in mass. When dried the colour is a "Bordeaux red." Water does not remove the colour, but alcohol pure or diluted diminishes it in time. Acetic acid decolorizes them quickly and solution of potash renders them yellow. After repeated washings, a cellulo-mucous matrix is observed in and around them containing secondary organisms. On staining the "grains" after slightly crushing the mass is seen to consist chiefly of amorphous matter around collections of cocciform "granulations," described by LAVERAN as "*Micrococcus Pelletieri*" and showed by THIROUX, PELLETIER and PINOY to be the spores of a fungus, *Oospora pelletieri* (THIROUX and PELLETIER) or *Nocardia madurae* Vincent (PINOY).

Within the grains are to be found filaments with granulations inside them—the mycelium of a fungus. The granulations are stained by Gram, but not the mycelium, which may be more or less degenerated. In spite of many attempts, the author has been unable to cultivate the "red grains."

P. S. A.

MANTELLI (Candido) & NEGRI (Giovanni). *Ricerche sperimentali sull'agente eziologico di un micetoma a grani neri* (*Penicillium mycetogenum* n. f.). *Nota preventiva*. [Experimental Researches on the Etiological Agent in a Mycetoma with Black Grains (*Penicillium mycetogenum* New Species). Preliminary Note.]—*Giorn. R. Accad. Med. d. Torino*. 1915. May-June. Vol. 78. No. 5-6. pp. 161-167.

An account of a fungus isolated from a case of mycetoma of the foot showing black grains. The authors identify it with *Penicillium glaucum*, Link, = *P. crustaceum*, Link, which does not seem to have been hitherto recognized as capable of causing Madura foot. On account of certain small cultural differences the authors are inclined to separate it as a new species under the name of *P. mycetogenum*. A fuller account of the cultural peculiarities of the organism are promised in a further memoir, for which doubtless the specialist will do well to wait. The present paper is not accompanied by any illustrations.

J. B. N.

JUNQUEIRA (Melchiades). *Ulcera phagedenica tropical, sua epidemiologia nos Municipios de Piracaia e S. João do Curralinho e seu Tratamento*. [Phagedenic Tropical Ulcer, its Prevalence in the Municipalities of Piracaia and S. Joao do Curralinho, and its Treatment.]—*Ann. Paulistas Med. e Cirurg.* 1915. Apr. Vol. 4. No. 4. pp. 92-94.

A report of an enquiry made by the author into the nature of an outbreak of ulcers of unhealthy character which prevailed in the two

municipalities named. In all, 139 cases were examined, of which about one half were found to be affected with ulcers of the specific character. In three cases, which were taken into hospital, the author was able to isolate the bacillus of Vincent with its associated spirillum. The majority of the patients were children under 10 years of age, and the sores, as usual, were situated on the lower extremities, being either complications of wounds or originating, apparently, in the bites of insects.

J. B. N.

FINOCCHIARO (Francisco) & MIGLIANO (Luiz). **Contribuição ao tratamento da ulcera tropical (Ulcus tropicum).** [A Contribution to the Treatment of Tropical Ulcer.]—*Brazil Med.* 1915. Dec. 4. Vol. 29. No. 46. pp. 361-362.

The authors find that permanganate of potash, either in the form of compresses soaked in a solution of one per mille or finely powdered, is a specific for tropical ulcer. Particulars are given of seven cases thus treated, all with success, in four of which compresses were used, and in the other three the powdered drug. A complete cure was achieved in every case, in from 10 to 30 days. Vincent's bacillus with its associated spirillum was detected in the sore in each case.

J. B. N.

ten BRINK (K. B. M.). **De therapie van het ulcus phagadaenicum tropicum.** [The Treatment of Phagedenic Tropical Ulcer.]—*Geneesk. Tijdschr. v. Ned. Ind.* 1915. Vol. 55. No. 4. pp. 437-440.

The author, being deterred by the cost of salvarsan, has tried Fowler's solution of arsenic, as a local application to tropical ulcers, with very good results. Where the patient had more than one ulcer, a comparative test was made, Fowler's solution being applied to one ulcer, while the others were treated with iodoform or sublimate dressings. Under these conditions it was found that the sore dressed with the arsenical solution healed better and more rapidly. An exception is to be made in the case of large ulcers, say of the size of the palm of the hand, in which case the caustic action of the arsenical solution becomes too pronounced. These should be treated in other ways. Since July 1911 the author has treated 1,544 tropical ulcers in this way to his entire satisfaction. The method has the advantage of cheapness, and also of avoiding the dangers of salvarsan.

J. B. N.

de SOUZA ARAUJO (Heraclides Cesar). **O granuloma venereum e a Roentgen therapia.** [Venereal granuloma and X-ray Treatment.]—*Brazil Med.* 1915. July 8. Vol. 29. No. 26. pp. 201-202.

A case of granuloma venereum in a man aged 20 years treated with X rays. Four applications of the rays, equal to 20 H-units of Holzknecht altogether, sufficed to bring about a cure. The lesion was situated in the right inguinal fold, and measured 8 × 5 centimetres in extent. The Wassermann reaction was positive, and therefore the patient was treated with mercury and salvarsan at the same time.

The lesion originated in the scar of a suppurating bubo. Reference is made to the pioneer work of MacLEOD and SEQUEIRA in this connection.

J. B. N.

TORRES (Octavio). **Considerações sobre a granuloma ulceroso, acompanhadas de duas observações.** [Remarks on Granuloma ulcerosum, with Notes of Two Cases.] *Brazil Med.* 1915. Jan. 8. Vol. 29. No. 2. pp. 10-12; Jan. 15. No. 3. pp. 17-20. With 4 figs.

Two cases of granuloma ulcerosum successfully treated with injections of tartar emetic, as proposed by ARAGÃO and VIANNA [see this *Bulletin*, Vol. 4, p. 160.] The author points out the importance of continuing the treatment for at least a month after the healing of the sore in order to prevent relapses. For want of this precaution the symptoms reappeared in the two cases recorded. He adopts the view that the *Calymmatobacterium granulomatis* described by ARAGÃO and VIANNA [*loc. cit.*] is the true cause of the disease.

J. B. N.

NIXON (J. A.). **Cotton Seed Dermatitis and its Cause, *Pediculoides ventricosus*.**—*Bristol Med. Chirurg. Jl.* 1915. June. Vol. 33. No. 128. pp. 73-81.

Dr. Nixon describes the irritating eruption produced on the arms and neck of labourers working in certain shiploads of cotton seed and gives a full description and photographs by Dr. W. D. HENDERSON of the acarus, the bites of which appear to be the cause. The creature seems to be identical with *Pediculoides ventricosus* which is believed to be the origin of "barley itch," observed among dockers engaged in discharging cargoes of barley.

He had the opportunity of investigating an outbreak and seeing an early case in January 1915 and other cases subsequently. The rash attacks the exposed parts, particularly the arms and neck, and disappears in about a week, unless renewed by continued work in the cotton seed or contaminated by scratching and becoming eczematous. The "itchy" cargoes came from Alexandria, and it was only when handling the seed in bulk that the rash appeared. Of 50 men working on one cargo alone two thirds had been attacked. The eruption resembled papular urticaria; no burrows were found.

As Dr. McLEOD has suggested, the acarus is probably a parasite of the cotton moth caterpillar.

P. S. A.

AREZZO (G.). **Dermatite da "*Pediculoides ventricosus*" in Italia.** [The Dermatitis produced by *Pediculoides ventricosus* in Italy.]—*Malaria e Malat. d. Paesi Caldi.* 1915. Sept.-Dec. Vol. 6. No. 5-6. pp. 250-254.

A summary of our knowledge as to the so-called "miller's itch" produced by the acarus *Pediculoides ventricosus*. In Italy it has been shown that this insect is harboured by beans as well as by corn [see a paper by MACRI recently noticed in this *Bulletin*, Vol. 6, p. 139].

J. B. N.

WHITFIELD (A.). *Acarus from a Case of Copra Itch*.—*Proc. R. Soc. Med. (Dermat. Sect.)* 1915. Apr. Vol. 8. No. 6. p. 116.

Dr. Whitfield showed an acarus from a case of "Copra Itch" in a stevedore in London, who had had two attacks. The rash was generalised over the trunk and extremities and at a casual glance resembled seborrhoeic eczema. The acarus was obtained from a specimen of the "Copra" and was identical with the variety of "*Tyroglyphus longior*, Gervais," described by CASTELLANI.

P. S. A.

RODHAIN (J.) & HOUSSIAU (J.). *Dermatite vésiculeuse saisonnière produite par un coléoptère*.—*Bull. Soc. Path. Exot.* 1915. Oct. Vol. 8. No. 8. pp. 587-591. With 1 plate and 1 fig.

In this paper is described a vesicular dermatitis occurring as an epidemic during the dry season at Leopoldville, due to a small beetle of the genus *Polderus* of the family *Staphylinidae*. The lesions appeared in two forms: vesicles on an erythematous patch 5 or 6 cm. in diameter, or vesicles on long streaks of 10 to 15 cm. with inflamed borders. There is an initial erythema of 24 to 48 hours, when the vesicles appear—soon becoming muco-purulent, persisting for 4 or 5 days and ending by desquamation. There are sensations of pricking and itching and sometimes of burning. The uncovered parts are principally affected, particularly the forearms, arms, neck, shoulders and face, and rarely the legs. Europeans are more liable to be attacked than the blacks.

The authors have only recently elucidated the etiology. The situation of the lesions and their nature, especially of the streak form, led them to suspect an irritant secretion from some moving insect. It was not a contagious eruption, for when several inhabitants of a house were attacked it was simultaneously, and in many cases only one was affected. When the epidemic was diminishing, one of the patients brought the insect, which he stated caused the trouble. To determine its pathogenicity three experiments were made. (1) A crushed beetle was rubbed over the skin of the forearm of a European; erythema appeared the next day and in 36 hours the vesicles, which took the usual course. (2) The crushed remains of four beetles in a little water were rubbed into the skin of a Macaque monkey and in two days the characteristic lesions appeared. (3) Three living beetles were placed under a bell jar on the shoulder of a black man and allowed to walk about the skin; three days afterwards no sign of irritation was observed.

The authors conclude that when the lesions are produced the insect must have been crushed and the secretions rubbed into the skin, and this explains the greater frequency of Europeans being affected.

P. S. A.

CHALMERS (Albert J.) & MARSHALL (Alexander). *Nile Boils in the Anglo-Egyptian Sudan*.—*Jl. Trop. Med. & Hyg.* 1915. Sept. 15. Vol. 18. No. 18. pp. 205-208.

This is an elaborate technical study of the organisms obtained from three cases of "Nile boils," a variety of tropical boils or tropical furunculosis known locally as "habba" if numerous, and "dimmal"

if single. The biological, cultural and biochemical characters indicate the organism to belong to the genus *Aurococcus* (Winslow and Rogers 1905) and the species *A. mollis* (Dyar 1895). The reactions are the same as those of the organisms of *Pyosis corletti*, with the exception that the growth does not liquefy gelatine and that it does not acidify xylose.

The authors consider that the only reliable treatment is an autogenous vaccine—two injections of 500 millions being usually sufficient to affect a cure. As prophylactic measures they recommend good food and sanitation, and a mild antiseptic permanganate bath; a weak salicylic alcoholic lotion “is worthy of a trial in order to prevent the spread of the boils.” P. S. A.

BIJON (Raymond). *Note sur un cas d'ainhum.*—*Bull. Soc. Path. Exot.* 1915. Oct. Vol. 8. No. 8. p. 570.

A little toe was excised for ainhum at the hospital at Bamako. Microscopical examination showed no acid-fast bacilli either in the part affected, or in the nasal mucus after giving iodide. The man exhibited no anaesthesia, although he had a leonine appearance. The conclusion was that it was not leprosy, and that ainhum is not a manifestation of that disease. P. S. A.

PALMA (Ricardo). *Qoyu siki. Manchas cutáneas congénitas de los aborígenes del Perú.* [The Congenital Cutaneous Markings of the Aborigines of Peru.]—*Cronica Med.* Lima. 1915. Oct. Vol. 32. No. 628. pp. 227–249. With 16 figs. and 1 map.

It is generally known that children in the Mongolian and American Indian races, including the Eskimo, are born with pigmented patches, looking very much like bruises, on the buttocks and neighbouring regions of the back. They are usually symmetrical, and are due to special large pigment cells, termed chromatoblasts, which are situated in the deeper layers of the skin [see the two figures opposite p. 242 of the present paper]. They generally disappear after infancy, but may persist till manhood. The author of the present paper suggests that they are rests or vestiges of a more general pigmentation of the skin in the ancestors of the Mongol and Indian races, and that this is the reason why they appear on the buttocks, where so many other congenital abnormalities are to be found. Their existence among the American Indians furnishes one of the strongest proofs that the New World was colonised from Eastern Asia. On page 245 the author gives a map of the world showing the regions in which these spots have been recognised. They are never found in the negro, nor in the European or Indo-Aryan races, and they occur among the Maoris of New Zealand and not in the aborigines of Australia. The author finds by his observations amongst half breeds between Europeans and Indians in Peru that the characteristic is a dominant one in the Mendelian sense, occurring in approximately 75 per cent. of the offspring in the first cross. This paper is a good contribution to the subject.\*

J. B. N.

\*A review of a paper by CASTOR was published in Vol. 1, p. 476 of this *Bulletin*. These maculae have been described in Europeans.—[Ed.]

**DAVEY (J. B.). The Etiology of Juxta-articular Subcutaneous Nodules.**  
—*Ann. Trop. Med. & Parasitol.* 1915. July 31. Vol. 9. No. 3.  
pp. 421-424. With 1 fig.

The author found 80 adult natives among 2,378 examined in the Dedzu districts of Nyasaland with subcutaneous movable nodules near the joints. These were apparently identical with the "juxta-articular nodules" described in Tropical medicine books, solid, tough, with no tendency to soften or break down, and no filariae or other organisms could be demonstrated in them. They were never found in children, of whom 567 were examined. They varied in size from that of a pea to a duck's egg, and their most common situation was on the posterior border of the ulna near the olecranon.

With eight exceptions all the subjects of these nodules had characteristic scars of, and admitted having had yaws, which is very common in the district.

The author considers that these nodules are to be regarded as a later manifestation of yaws.

P. S. A.

**KINDLEBERGER (C. P.). A Study of the Etiology of Gangosa in Guam.**  
Based upon Luetin Reactions and Noguchi Tests on 369 Gangosas and 16 Controls.—*U. S. Naval Med. Bull.* 1914. July. Vol. 8. No. 3. pp. 381-410.

Gangosa, a disease of unknown origin which has existed in Guam for over 100 years, was first described in 1828 by Don F. RUIZ de VILLALOBOS and named in 1904 "Rhinopharyngitis mutilans" by Surgeon J. F. LEYS, whom the author largely quotes, as well as Surgeon H. E. ODELL (1911) and W. M. KERR (1913). Antisyphilitic treatment, mercury and iodine, was employed by ODELL with much success, and this, with salvarsan, was continued by the author with healing of the open gangosa lesions. A definite specific causative organism has not yet been found.

The question of its hereditary transmission cannot be definitely settled at present. In 373 cases, 100 stated that they had no gangosa relatives; in 75, parents or grandparents were affected; and in 78 brothers or sisters. The disease is not in Guam regarded as contagious, and although no precautions are taken no case is known of its transmission to healthy members of a family.

Gangosa victims with facial mutilation and deformity may resemble lepers, but its tendency to spontaneous cure, the absence of typical symptoms of leprosy and of the bacillus leprae negative any connection between the two diseases. Nor have tubercle bacilli ever been found in the lesions.

Yaws is very common in Guam; in many parts 90 per cent. of the natives have it in childhood. In 369 cases of gangosa, 285 or 77.23 per cent. state that they have had yaws. *Treponema pertenue* has never been found in gangosa lesions in this island, nor has the *Treponema pallidum*. Luetin and Noguchi tests were made in 369 cases by Surgeon E. E. CURTIS, giving for the former 253 and for the latter 262 positive results. In spite of this large percentage of positive luetin tests (68.58 per cent.) the author is inclined to believe that gangosa is principally a sequela or tertiary stage of untreated yaws, as that disease is so common among the natives of Guam.

At present, primary or secondary syphilis is unknown in the island, although sailors may have introduced it in former times and before the American occupation.

"At the present time, therefore, we must conclude that although the exact origin of gangosa is unknown it is probably a tertiary stage or sequel of untreated yaws, combined with a more or less strong element of hereditary syphilis."

The last 19 pages are occupied by a tabular record of the cases.

P. S. A.

BOLETIM DA SOCIEDADE BRASILEIRA DE DERMATOLOGIA. 1914.  
Vol. 3. Nos. 1-2-3.

*Deux cas de granulôme ulcèreux des organes génitaux* (F. TERRA) [p. 72].

The author has recorded several of these tropical affections in which intravenous injections of tartrate of antimony have given wonderful results. One of the present patients is a Brazilian half caste, aged 22, who contracted the disease two years ago in Rio de Janeiro. The inner part of the thighs, the scrotum and perineum are the site of elongated vegetating ulcers bathed with foetid serum. [This case is figured.] The other is a Brazilian negro, aged 31, affected for one year with a similar condition. In both cases, round corpuscles of Donovan were found, grouped within large cells, and some extracellular.

*Traitement du granulôme ulcèreux des organes génitaux* (Werneck MACHADO) [p. 77]. With fig.

Three women were shown, two with the vulvar and perineal lesions quite cured and the third in course of cure by tartrated antimony.

Dr. TERRA in discussing these cases alluded to the treatment by subcutaneous injections of trixidine, which he had given up in consequence of the pain and severe inflammatory effects produced.

Another case of the same disease in a Brazilian half-caste aged 21 and nearly cured by antimony tartrate, was shown at a subsequent meeting by Dr. A. DAMASIO.

*Ainhum double symétrique et synchronique* (Silva Araujo FILHO) [p. 79]. With fig.

This occurred in a Brazilian, aged 22, commencing in the left little toe two years ago. The little toe of the other foot also became affected. This disease is rare in Brazil and usually only seen in negroes.

*Vaccine et lèpre* (F. TERRA) [p. 81].

The author had occasion to vaccinate several lepers with animal lymph against small-pox. There was constitutional disturbance, and in the cutaneous cases an outbreak of spots and lepromas. After the reactionary stage, there was considerable amelioration of the older leprosy lesions. He asks whether there is any connection between vaccine and leprosy and whether vaccine therapy may not be of use?

*Piédra* (Werneck MACHADO) [p. 82].

A Brazilian, aged 20, with nearly all the hairs roughened with small, dark, gritty nodosities. The parasite does not seem to be the same as that previously known in Brazil.

*Traitement du granulôme tropical* (Werneck MACHADO) [p. 83].



A Brazilian coloured woman of 40, with extensive ulceration of the pubes, vulva, perineum and neighbouring parts of five years' duration; Wassermann positive; Donovan's corpuscles found; no result had been obtained from a physiological serum, "606" or "1116," but injections of 5 to 10 cc. of a 1 per cent. solution of antimony tartrate had effected a cure after the 10th injection.

*Blastomycose buccale* (F. TERRA) [p. 83].

A Brazilian, aged 50, with extensive ulceration and swellings of the lips and mucous membranes of the mouth, and submaxillary glands affected; commenced five months previously as a small ulcer of the right labial commissure. Wassermann negative—characteristic blastomycetes found and cultured.

*Blastomycose buccale* (Werneck MACHADO) [p. 86].

A Portuguese labourer, aged 28, with ulcerations on the palate and right tonsil, affected six years, with swollen and painful submaxillary glands.

*Cas de blastomycose—Autopsie* (D'Utra SILVA) [p. 88].

This case had been shown to the Society. At the autopsy the lesions in the front part of the buccal cavity seemed to have cicatrised, but the affection was still active on the back, cheeks and tonsils. There were lesions in the lungs and the glands of the neck were suppurating. Treatment by iodide of potassium had not been successful.

P. S. A.

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## TROPICAL DISEASES BUREAU.

# TROPICAL DISEASES BULLETIN.

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## TYPHUS.

**MEREWETHER** (Edward R. A.). **A Report on the Late Medical Conditions in Serbia, with Special Reference to the Typhus Epidemic.**—*Jl. R. Naval Med. Service*, 1916. Jan. Vol. 2. No. 1. pp. 58-64.

This interesting paper gives a general review of the conditions prevailing in Serbia under normal and war conditions. Some of the main points only can be noted here. Certain general conditions prevail. The summer is extremely dry and hot, the winter cold. Severe floods occur in the river valleys in spring, the breeding grounds thus provided for mosquitoes causing malaria to be endemic in the valleys. The equable distribution of the population and the lack of communication, which should limit epidemics, have been overcome by the flight of refugees, and the consequent overcrowding has favoured the development of epidemic diseases.

The standard of housing was fair, cleanliness of dwellings varied but the majority of dwellings were not clean. The people kept their bodies and under garments clean, but the outer garments were often filthy. Sanitary conveniences were extremely bad, often no attempt at disinfecting or disposing of excrement being made. The water supply was either from springs or from "typical examples of the worst kind of well." The supply of both hospitals and doctors was very inadequate.

The majority of infectious diseases were cases of typhus and relapsing fever, but some cases of enteric, variola, erysipelas and scarlet fever occurred. Except for typhus, relapsing fever caused more loss of time in the army than any other disease. No abnormal features were presented by relapsing fever patients, except there were a large number of cases in which acute suppurative parotitis developed as a complication. Erysipelas was slowly increasing. Cases of plague with 100 per cent. mortality have been reported from Salonica.

The typhus epidemic was very severe. No prodromal symptoms were noted. Severe headache was a constant feature. Prostration was marked. "Two early signs are bands of injection of the conjunctiva, extending from either canthus towards the cornea, and slight contraction of the pupil." The rash appeared on the 5th to 6th day as small, carmine petechiae. Toxaemia was marked during the second week. Towards the 12th day nearly every case seemed

moribund. From then, either improvement or death ensued. Convalescence was rapid and relapses were rare. Local gangrene and suppurative parotitis were common complications. Otitis media and slight deafness also were frequent. Severe myocarditis was constant. The age of the patient was important for prognosis; those over 40 had little chance, and the case mortality progressively increased with each decade.

The treatment recommended consists in immediate going to bed, keeping perfectly flat, and undergoing no exertion. Fresh air and persistent hydrotherapy are necessary. The bowels must be kept open and all means adopted to keep the urine adequate in quantity and of a pale straw colour. In convalescence, the heart takes a long time to recover, and the shoulders of the patient should not even be raised until a week after the temperature has fallen to normal. Every care must be taken to prevent strain.

The spread of typhus in louse-infected communities was astoundingly rapid. From the number of cases among doctors and nurses, it is considered that there may be secondary channels of infection, and that "carriers" may be responsible for some cases.

Prophylactic measures are directed against lice. All clothing of patients, whether typhus cases or not, must be disinfected. The patients must be given antiseptic baths. Louse-proof clothing must be worn by all. This is "a cotton outer garment consisting of trousers, with socks for the feet, with a sleeved coat, the whole made in one piece and opening down the front. It should be closely tied at the wrists and neck, and the head should be covered with a cotton cap; nurses can wear their ordinary cotton dresses over these." Similar underwear to this should be worn by everybody. Railway carriages and public conveyances should be repeatedly disinfected. Formaldehyde vapour, except when very concentrated, is of little use against lice; sulphur dioxide is preferable. For personal application one of the many paraffin preparations is useful and effective. Some German writers since the war have recommended powdered naphthalene and naphthalene ointments for this purpose.

A. Porter.

HOWELL (B. Whitchurch). *Typhus in Serbia.* —*Brit. Med. J.* 1915. Dec. 4. pp. 813-814.

This paper contains an account of an outbreak of typhus at Vrnjatchka Banja, Serbia. The patients were mostly Austrians, and the mortality was greater amongst them than amongst the Serbs.

On admission it was essential that the hair of the head and of the pubic region should be cut short and treated with paraffin or unguentum hydrargyri. Even then fresh broods of lice appeared.

It was considered that the more intense the rash, the graver was the prognosis. The cases were generally of the malignant type. As a rule, the fever fell by lysis with occasional "kicks" on the temperature charts, which, the author states, is contrary to the usual teaching. The initial symptoms were like those of influenza.

With regard to treatment, alcohol in half ounce doses was used, the quantity being increased steadily as the pulse got weaker. The heart was supported by the usual drugs and ether was sometimes given subcutaneously in very severe cases, alternately with strychnine.

A. P.

RUDIS-JICINSKY (J.). **Typhus in Serbia.**—*New York Med. Jl.* 1915. Dec 11. Vol. 102. No. 24. Whole No. 1932. pp. 1175–1177.

The author worked at the base hospital at Skoplje, Serbia. A diplococcus was found to be present in the blood of many typhus patients. It was non-motile, Gram positive, did not coagulate milk or form indol or ferment grape sugar, nor did it split milk sugar. It proved pathogenic to rabbits, from which the diplobacillus was recovered. Subcutaneous injections of a bouillon culture of the diplobacillus produced an abscess containing a pure culture of the organism.

Measures were taken in the hospital for the destruction of head and body lice, both on the patients and on clothing. Paraffin or petrol destroyed the nits and, among other oils, were found useful on patients' heads and clothes. Exposure to heat was also useful for destroying lice on clothes.

The populace was instructed as to the early symptoms of the disease. With regard to treatment, the author remarks that "the supply of fresh air to typhus patients brought a great reduction in the mortality rate."

A. P.

GASTOU (Paul). **L'Epidémie de Typhus exanthématique à Belgrade. Notes Cliniques, Anatomiques, Etiologiques et Pathogéniques. Essais de traitement par les Sérums physiologiques citratés et iodés.**—*Rev. de Méd.* 1915. Aug. 1914.–Nov. 1915. Vol. 34. No. 8–9. pp. 559–578. With 8 figs. & 1 plate.

This interesting paper contains an account of the typhus epidemic in Serbia. 1,600 to 2,000 cases were seen in Belgrade. About equal numbers of men and women were infected. The outbreak is dated from the time of defeat of the Austrian army, when many prisoners from districts where typhus is endemic were taken. The conditions during the height of the epidemic were appalling; many details regarding them are given. Cerebrospinal symptoms predominated and there were other symptoms recalling cerebrospinal meningitis. Acute cases succumbed in three to six days. Ten per cent. of the cases died. Certain constant lesions were found at autopsy, cerebrospinal meningeal exudate and myocarditis being present. The dura mater was thickened and adherent. The brain was oedematous and pale. The left ventricle of the heart was usually hypertrophied. The lungs and other organs showed congestive lesions. The liver was white and soft and the suprarenals hypertrophied.

The louse is considered to be the transmitter of the disease. Examination of lice by darkground illumination showed fine rods with vibratile cilia; short, straight or curved rods; mobile spherules with flagella; brilliant motile spherules; spherules showing a polar body; a kind of diplococcus in the form of a figure of 8; a very thin immobile microbacillus, and colloidal granules. The thin immobile bacillus was the most common.

Examinations of the blood showed rapid haemolysis, absence of fibrin and coagulation, absence of haematoblasts, presence of elements (C240)

believed to be fibrin, large macrophage cells, eosinophiles, rare and often altered polynuclear leucocytes. Some cases with mononucleosis occurred. Abundant crystalline masses of haematoidin were present but no colloidal granules. *Plasmodium vivax* was sometimes present. Elements described as apparently parasitic were, spirilliform bodies; mobile spherules with a brilliant, peripheral polar grain; mobile spherules; small bacilli, which are immobile; small mobile bacteria; very small cocco-bacilli; a diplococcus in the form of a figure of 8.

The cerebrospinal fluid was usually clear. It contained undetermined mobile spherules, rods, diplococci in the form of a figure of 8, a Gram negative diplobacillus, and an almost invisible, immobile bacillus. The latter organism and the diplococcus were the most constant, but were only present in 6 out of 30 cases examined.

Cultures of the blood were made aerobically and anaerobically. No syringes were available and the cultures were sown direct from a vein. There was thus the possibility of contamination. The diplococcus in the form of the figure of 8 was obtained, and also a fine bacillus. Cultures of cerebrospinal fluid gave similar results.

Abundant ventilation and cold applications were employed. Applications of turpentine were of service in some severe cases. The injection of typhus blood into another case and also the injection of the patient's own blood into himself, as well as the injection of citrated blood from convalescents, have been used with good results in some cases. Injections of isotonic, citrated or iodised, sterilised solutions did not arrest the typhus but stopped the nervous developments. The iodised serum seemed better than citrated serum, and modified the malady by reducing it somewhat and producing a drop in temperature.

A. P.

DETRE (Ladislaus). *Ueber Flecktyphus.*—*Wien. Klin. Woch.* 1915. Sept. 30. Vol. 28. No. 39. pp. 1049-1054. With 14 charts.

This paper contains an account of the authors' experiences with a typhus epidemic at Pozsony. He advocates the isolation of all patients, quarantine of all contacts, thorough measures against lice, and the use of clothing and headwear specially adapted for lice prevention. A discussion of the time of incubation period and of symptoms observed is given. The duration of the fever varied, 29 per cent. of the cases were between 4 and 7 days, 37 per cent. between 8 and 10 days. Two-thirds of all the cases recovered within 10 days. Some abortive cases were also observed and a number of patients with multiple infections of typhus with other maladies such as malaria, relapsing fever and chest complaints were encountered. The mortality in the winter was from 30 to 40 per cent., while in the spring a mild form with a mortality of only 11 per cent. prevailed. The author found that in six cases the injection of serum from convalescents gave defervescence in from 8 to 24 hours.

A series of temperature curves of typhus and of typhus complicated with other diseases such as relapsing fever and malaria is given.

A. P.

**JUERGENS.** *Zur Epidemiologie des Fleckfiebers.*—*Berlin. Klin. Woch.* 1915. June 21. Vol. 52. No. 25. pp. 654–661.

The paper contains an account of an epidemic of typhus observed by the author among Russian prisoners in a war camp in November 1914. The typhus outbreak was preceded by many cases of influenza, which complaint was apparently at first confused with the early symptoms of typhus. The onset of the typhus was extremely rapid. Body-lice were the agents in spreading the malady. It was found that men in charge of typhus patients and in close contact with them did not contract the infection, but those working with infected lice did so in a number of cases. The typhus appeared to have an incubation period of two to three weeks. Quarantining of patients and of convalescent men was practised. The principal prophylactic measures consisted in the destruction of lice and in simple disinfection methods. Five figures showing the arrangements at the camp are given.

A. P.

**OTTO.** *Beobachtungen bei einer Fleckfleberepidemie.*—*Deut. Med. Woch.* 1915. Nov. 4. Vol. 41. No. 45. pp. 1325–1328. With 8 curves; Nov. 11. No. 46. pp. 1357–1359. With 3 text-figs.

A slight outbreak of typhus fever was observed by the author at the war-prisoners' camp at Weinberge bei Z. Relatively few cases of typhus occurred at this camp compared with the numbers at other camps. Lice were considered without doubt to be the transmitters of the virus. Very thorough measures for lice extermination were undertaken, and the camp was soon freed from them. After this occurred no further cases of typhus were reported. Treatment by cold baths, sometimes accompanied by administration of urotropin, was given.

A few atypical cases of typhus without the characteristic rash were identified by the temperature curve. Many polynuclear leucocytes and basophile granulation were observed in the blood. No protozoa-like bodies such as were described by PROWAZEK were seen, and the bacteriological examination of the blood was equally negative. Guinea-pigs were infected by intraperitoneal inoculation of blood, and some of them died. Complement fixation reactions were found to be negative in the early stages of the disease, and thus their value in diagnosis was rendered less.

Attention is drawn to the similarity of typhus clinically with Weil's disease, of which the author had previous experience. The analogy between the two diseases is considered as doubtless indicating an identical or nearly allied origin for both maladies.

A. P.

**FLUEGGE (G.), GAERTNER (A.), BUJWID (C.), KISSKALT, UHLENHUTH (P.) & STOKLOSINSKI (Franz).** *Umfrage über Uebertragung und Verhütung des Fleckfiebers*, [Symposium on the Method of Transmission and Prevention of Typhus.]—*Med. Klinik.* 1915. May 9. Vol. 11. No. 19. pp. 531–533; May 23. No. 21. pp. 586–587.

This paper consists of a series of reports made by the above-named workers on typhus cases, in answer to a series of questions suggested by Dr. Gustav SINGER, of Vienna.

Flügge stated that practically only body lice were found on the patients, and that no infection took place through contact with infected blood. Transmission by the louse was possible after 5 to 7 days. For removal of lice, thorough soaping of the body is recommended. Clothing should be disinfected by wet or dry heat; leather sacks, uniforms, etc. by dry heat. No certain protection to workers with typhus cases was known. Rubbing with ethereal oils, the use of naphtha balls, thorough cleanliness, the use of closed-in clothing and of gum on garments to trap lice are recommended.

Gaertner considers that body lice are certainly the transmitters of typhus, and that head and pubic lice are suspect. Direct transmission by blood inoculation is possible, but is rare. For the destruction of lice, treatment of clothes, coverings and bedding with damp heat at 100° C. is recommended, while 2½ per cent. cresol or 3 per cent. carbolic acid solution should be used for the dwelling. All openings of clothing should be closed with linen strips treated with ethereal oil or naphthalene, and rubber gloves and high boots should be worn.

Bujwid thinks that an epidemic is started by spray from the breath of diseased persons reaching healthy ones by coughing. The person should be freed from lice by bathing. Floors should be wiped with a mixture of mineral oil or petroleum and turpentine. Fumigation of dwellings by sulphur dioxide against bugs, and the use of insect powder in transport wagons is advised.

Kisskalt emphasises the rôle of lice as infective agents. He also recommends the use of sulphur dioxide and naphthalene.

Uhlenhuth states that body lice certainly convey typhus, but lung and breath secretions may also play a part. The destruction of lice in clothing should be done by damp heat, while dry heat should be used for equipment and interiors. The greatest care must be taken to prevent the access of lice, and birdlime or fly-glue can be used as traps, if available.

Stoklosinski considers that blood-sucking Epizoa (various lice, fleas, bugs) are concerned in the transmission of typhus, which is spread more particularly by fleas. Flies and mosquitos may possibly aid in transmission. The extermination of lice is, in his opinion, not sufficient, but the destruction of all insects frequenting the person should be attempted. The flooring and walls of all sick rooms should be covered with washable material, such as linoleum. Thorough disinfection of clothing is necessary. Fly destruction should be carried out. The personnel of hospitals need well-closed cloaks, rubber gloves, and high boots reaching to the knee. Scrupulous cleanliness and good ventilation of the sick room are essential.

A. P.

BRILL (Nathan E.). **The Form of Typhus Fever that is Endemic in New York City.**—*Med. Record.* 1915. Nov. 27. Vol. 88. No. 22. Whole No. 2351. pp. 914-917.

This interesting and well-written paper contains an account of the author's remarks made in opening a discussion on typhus fever at the New York Academy of Medicine, October 21st, 1915. It also contains a useful comparison of the mild, endemic form of typhus, known as "Brill's Disease," found in America, with the virulent, epidemic typhus. Dealing with the sanitary aspect of typhus, the author

stated that "the amount of typhus fever among nations was in *indirect* proportion to the amount of soap used. In other words, where cleanliness was not maintained, where the ordinary laws of hygiene were transgressed and neglected, there would be found typhus fever, with all its accompanying horrors." Consequently, it was associated with conditions of personal filth, with the segregation of people in confined quarters, with states producing squalor and famine, and followed in the wake of war.

Epidemic typhus fever is a disease most prevalent in cold weather, while the mild form is most prevalent in the summer months.

The main features of epidemic typhus are recapitulated thus:—

"It is a disease accompanied by profound toxemia, marked by the signs of an intense blood infection, by a marked involvement of the nervous system, manifested by delirium, by excitement, by tremor, by somnolence, stupor, coma-vigil, and an unusually severe involvement of the muscular system as well, as shown by the tremor and physical exhaustion which are so often manifest."

The second, mild, attenuated, endemic form of typhus (Brill's disease) and epidemic typhus are alike in their onset, in the first stage of the eruption, in the critical decline, and both are not followed by relapse. They differ in other respects. The eruption of the mild form rarely reaches the haemorrhagic or purple stage and spots which do not fade under pressure are rarely produced. Signs of profound involvement of the nervous system are absent. The patient is never seized with maniacal excitement during delirium, there is no coma-vigil, muscular tremors, subsultus or carphology, nor is there involuntary discharge of urine and faeces in the mild form. The headache in the endemic form becomes progressively more intense, even to the end of the illness, but is replaced by the more nervous manifestations after the first week in the epidemic form. The mortality in the mild form is less than  $\frac{1}{4}$  per cent., while in the epidemic form it varies from eleven to sixty per cent. of the cases. While the epidemic form of typhus is one of the most communicable of all diseases, the endemic form shows no evidence of being at all communicable, and thus the body louse is not an important factor in the production of the mild form of the disease.

The author recalls the work of his pupil PLORZ, who isolated the organism of the mild form and that of the epidemic form of typhus, and found them to be identical. The said diseases are thus identical, and the name "Brill's Disease" is superfluous, it being "a peculiar typhus fever which has been evolved by modern improved hygiene and sanitation." Both diseases are caused by the *Bacillus typhixanthematici*.

A. P.

KANTOR (J. I.). **The Importation of Typhus Fever into the United States.**—*Jl. Infect. Dis.* 1915. Nov. Vol. 17. No. 3. pp. 522-527.

America is said to be exposed to importation of typhus from three sides, Europe and Africa, Asia, and Mexico, cases having already occurred from the last source. Typhus-bearing ships cross the Atlantic in about two weeks, and persons infected with typhus are usually recognisable as such when they arrive in America. The quarantine system reduces the danger of admitting cases of typhus from Europe to a minimum. However, lice imported on the persons of emigrants may harbour the typhus virus.



Details are given of three isolated cases in which typhus appeared after the arrival in America from Europe of the persons concerned. Typhus did not exist at the ports of departure, the space of time elapsing between the date of embarkation and the development of the disease in America exceeded the maximal incubation period, while the time between arrival in America and the development of the disease is within the incubation period limit. Infected lice harboured by immune fellow passengers probably brought about the infection of the victims.

In America, it has been found that all convalescents from Brill's disease (the endemic typhus of America) are typhus immunes, who may act as typhus carriers.

The author gives the following summary :-

"The isolation of immigrants sick with typhus fever and of their contacts, does not prevent the introduction of the disease into this country.

"It is very probable that immune carriers of typhus lice, by infecting individuals on shipboard, have caused the importation of cases of epidemic typhus fever.

"It is possible that Brill's disease may be the result of the introduction into this country (by immune carriers) of lice harbouring attenuated typhus bacilli.

"In order to prevent the further importation of all forms of typhus fever, attention should be directed not so much against individuals, as against lice, the actual carriers and transmitters of the disease in question."

A. P.

ANDERSON (John F.). **The Epidemiology of Typhus Fever.**—*New York Med. Jl.* 1915. Dec. 11. Vol. 102. No. 24. Whole No. 1932. pp. 1172-1175.

The author deals with cases of typhus in Mexico. He has also seen 60 to 70 cases in England, as well as others in the United States. He finds no essential differences in typhus in these countries, except as to mortality and severity. In Mexico and in England the mortality is stated to be about 20 per cent., while in the United States it is only 2 per cent., and in the case of Brill's disease only 1 per cent.

Typhus is limited to temperate climates, and is only found in those regions of the tropics where such climates exist. The inability of the disease to spread in warmer climes, and its lessened prevalence in summer and autumn is believed by the author to be due to the effect of higher temperatures on the transmitting insect, *Pediculus vestimenti*. In Mexico typhus was never seen below an altitude of 5,000 to 6,000 feet.

The author has transmitted the disease to monkeys in Mexico by the inoculation of blood from human cases.

Among the preventive measures, lice extermination is recommended. It is also suggested that "inoculation with the mild type of the disease (Brill's disease), by persons contemplating entering places where the disease is prevalent" may be of service. "Should Plotz's work be confirmed, this may be replaced by the use of a vaccine prepared from the typhus fever germ."

A. P.

ALLAN (James W.). **Typhus Fever and Lice.** (Correspondence).—*Brit. Med. J.* 1915. Dec. 4. p. 841.

DAVY (P. C. T.). **Typhus Fever and Lice.**—*Ibid.* Dec. 11. pp. 875–876.

The first paper deals with previous remarks regarding lice as the transmitters of typhus, and the author points out that it is unwise to regard lice as the sole source of danger. If a person unprotected by a previous attack remains for some time near a patient in a close, stuffy, unventilated room he runs the risk of contracting the disease, even if no lice are present. Previous writers (DAVY and BROWN, see below) have “found evidence that the infective agent resides in the body at least three weeks after defervescence. Fresh outbreaks occurred when patients returned to their companies after the three weeks’ period, though they and their clothes were disinfected and were presumably lice-free.” While not denying that infection may be carried by lice, and that every means should be employed to get rid of them, the author has faith in cubic space and free circulation of fresh air as prophylactics in the case of typhus.

The second paper is a comment on the preceding one. The author writes that, in a previous note, he wished to convey that “men who returned to their companies free of all lice immediately became infested with lice anew, and being still infectious, infected a new generation of lice, with the result that, in due course, a recrudescence of the epidemic occurred.”

He also mentions that in the “high tension” type of typhus, it was common for the pulse rate never to go above 90 during the entire pyrexial period and to remain between 70 and 80, while the temperature remained on a plateau of 103° to 104° for several days.

A. P.

WOLTER (Friedrich). i. **Ueber den Flecktyphus als Kriegsseuche.** [Typhus as a War Disease.]—*Berlin. Klin. Woch.* 1915. Aug. 9. Vol. 52. No. 32. pp. 851–854.

ii. **Ueber das Auftreten von Flecktyphusepidemien in Truppen- und Gefangenelager.** [The Occurrence of Typhus in Military and Prisoners’ Camps.]—*Ibid.* Oct. 4. No. 40. pp. 1045–1048.

i. The author gives an account of the chief hypotheses that have been put forward to account for the spread of typhus fever. CURSCHMANN’s opinion that typhus was air-borne is discussed, and his views that fresh air and ventilation were most useful in treatment are quoted. The opinion of LINDNER-LINZ that the louse was the transmitter of the typhus virus is stated, together with JÜRGENS’ view that it is not the infected man but the infected louse that spreads the disease. The work of other recent writers on typhus is noted. The paper is chiefly of interest from the historical side, but attention is directed to the danger of overlooking the possibility that typhus is air-borne in dealing with outbreaks.

ii. This paper contains a criticism of JÜRGENS’ view that typhus is spread by lice, as was set forth in a recent paper by that worker. A detailed account of the place in which the epidemic observed by JÜRGENS occurred has led the present author to conclude that the louse transmission hypothesis is insufficient to account for the epidemic.

Removal of persons from an infected site is, in his opinion, sufficient to check and destroy the outbreak. The transmission of typhus by way of the air is considered the most likely means, and it is stated that miasmatic typhus is responsible for epidemics.

A. P.

BROWNE (James Crichton). **Note on Typhus Fever.**—*Jl. State Med.* 1916. Jan. Vol. 24. No. 1. pp. 1-6.

A general account is given in a popular style of the main features of typhus epidemics. "Dirt, darkness, drink and destitution" favour the prevalence of typhus. The disease also appears where civilisation has broken down and hence is coincident with wars.

Lice are typhus carriers, more especially in war areas, but that does not preclude communication of the disease by other means. It is suggested that, like pneumonic plague, typhus may sometimes be spread by the breath, thus accounting for infections of doctors and nurses. The author states that "it seems that a certain concentration of the poison is necessary to cause infection," while the success of treatment in wooden huts with badly jointed walls is considered to "point to the danger of the accumulation of some poison in the atmosphere of confined spaces." While the louse is considered to be the principal transmitter, yet these other possible means of infection may be remembered. Some remarks on the differentiation of typhus from plague and relapsing fever are also given.

A. P.

WAGENER (R.). **Zur Differentialdiagnose des Fleckfiebers.**—*Med. Klinik.* June 20. Vol. 11. No. 25. pp. 691-698.

This paper contains a long account of the symptoms of typhus and the course of the rash. It also sets forth in a very verbose manner the means of differentiating typhus from other complaints such as measles, influenza, miliary tubercle and meningitis. [A far more succinct and wider differential diagnosis can be found in CASTELLANI and CHALMERS' "Manual of Tropical Medicine," p. 1097.]

A. P.

HETFIELD (W. B.). **Unusual Type of Typhus Fever on U.S.S. "Monocacy."** **Report of Case.**—*U.S. Naval Med. Bull.* 1915. Oct. Vol. 9. No. 4. pp. 641-643.

The record of a somewhat doubtful case occurring in a seaman at Chungking. The patient showed one characteristic feature of typhus, viz., the presence of a rash which at first disappeared easily under pressure, later with difficulty, and then not at all, and the occurrence of subcutaneous haemorrhage. The remarkable feature of the case was the complete absence of prostration and delirium in spite of a high fever. The only symptom the patient complained about was a sore throat and he suddenly died after a violent attack of dyspnoea. On post-mortem the epiglottis showed a decided catarrhal inflammation and was somewhat swollen though still patent. Oedema, however, seemed the most probable cause of death.

E. Hindle.

REMLINGER (P.). **Le "Signe de la Langue" dans le Typhus exanthématique.**—*Paris Méd.* 1916. Jan. 8. Vol. 6. No. 2. pp. 42-43.

The author gives the results of his observations on an early sign observed by him in cases of typhus in Tangier during the last three years. It was found that if a patient suffering from typhoid or paratyphoid was asked to show his tongue, it was done without any difficulty. If, however, a typhus patient was asked the same thing, though he made every endeavour to do so, he could not succeed, or had but very indifferent success at the expense of very great effort. The tongue seemed to be stuck to the palate or at other times to be drawn back towards the larynx.

This sign has been noted previously by many workers, more especially by French workers, and that in many places, so that this peculiarity of the tongue is not restricted to Morocco. A number of quotations from various workers in different places are given in support of this statement.

A. P.

COGLIEVINA (B.). **Neuere Behandlungsmethoden des Fleckfiebers.** [Recent Methods of Treatment of Typhus.]—*Med. Klinik.* 1915. Dec. 5. Vol. 11. No. 49. pp. 1351-1352.

Short notices of some of the more recent treatments devised for typhus fever are given in this paper.—WERTHEIMER's treatment by exposure of the patient to direct sunlight [this *Bulletin*, Vol. 6, p. 393], the use of normal horse serum by ROUBITSCHKE [loc. cit., p. 392], the use of a typhoid vaccine by MOLLOW [loc. cit.]. ICHIKAWA has also used a vaccine intravenously. OUFUGANINOFF has treated typhus with iodine, but details of the dose have not been given.

The author's own work is given on the treatment of typhus with hexamethylene-tetramine, which in the body gives rise to formaldehyde, that has a sterilising action. One gram of urotropin was administered per oz., on the first day twice, on the second four times and, after that, five times daily. The good results obtained are stated to have accrued especially as the hexamethylene-tetramine reaches the cerebro-spinal canal and there exercises an antiparasitic action.

Quinine and salvarsan are said to have been shown to be useless by several previous workers. Other methods are not noted as they are considered to be still under test.

A. P.

SCHUERER VON WALDHEIM. **Zur Behandlung des Flecktyphus.**—*Med. Klinik.* 1915. June 6. Vol. 11. No. 23. pp. 643-645. With 3 charts.

The essential feature of the treatment for typhus, used in Mauthausen and detailed in this paper, is the use of cold wet applications and rubbing. The patient is wrapped in a cold, wet linen sheet, surrounded by two or three woollen wraps for one to one-and-a-half hours, and then has a cold rub down. The wet application and rubbing down is made every two hours during the day and every three hours during the night. If the temperature reaches 40° C. or more, the wet application is renewed hourly. At the commencement of the illness, hot milk, warm lemonade, orange, compote or prunes, was given in

teaspoonfuls. After the crisis had passed, mucilaginous soups, rice-milk, biscuit, etc., were given in larger quantities. Careful nursing was necessary.

It was found that alcoholic subjects stricken with typhus showed headache, great restlessness and delusions, while non-drinkers did not. If the patients had sound organs the prognosis was satisfactory, but if the chief organs had been weakened by self-indulgence, the prognosis was very unfavourable.

Temperature charts of cases of typhus, lasting 10, 11 and 8 days respectively, are given.

A. P.

**ESCLUSE. Essai de Traitement curatif du typhus exanthématique par les "Injections intraveineuses de sang vivant de convalescent retardé dans sa coagulation par le citrate de soude."**—*Presse Méd.* 1915. Nov. 11. No. 55. pp. 450 451. With 3 charts.

The author was attached to the French military medical mission to Serbia. While at Belgrade, he treated three very severe cases of typhus with intravenous injections of blood obtained from a robust convalescent patient at the eighth to tenth day of defervescence. The usual aseptic precautions having been taken, 10 cc. of blood obtained from a vein in the arm of a convalescent was mixed with a little citrate of soda, and inoculated as rapidly as possible into a vein in the arm of the patient. Details are given of the three cases under observation.

The author's conclusions may be translated as follows :—

(1). Intravenous injection of living blood from a convalescent, to which a little citrate of soda is added, has been successful in very severe cases of typhus.

(2). There appears to be in typhus a very virulent toxin, which, having entered the bloodstream, has a predilection for muscular tissue, especially the myocardium, and for nerve cells. There is, however, in very severe cases of typhus a certain period, which it is proposed to determine methodically, when it should be possible to neutralise the toxic effects by blood immunisation. The natural phagocytic reaction of the body should be reinforced, perhaps prematurely, by injection during the fourth to the tenth day at the latest.

(3). It is essential that robust convalescents, in their eighth to tenth day of defervescence, only should be chosen.

(4). During twenty-four hours a total quantity of 30 cc. of convalescent blood can be injected in three doses with impunity. Cure may depend on perseverance with the treatment. (One patient received six injections spread over three days).

A. P.

**ASCHOFF (L.). Ueber anatomische Befunde bei Fleckfieber.** [Morbid Anatomy in Typhus.]—*Med. Klinik.* 1915. July 18. Vol. 11. No. 29. pp. 798-799.

An account is given of the various anatomical features observed in post-mortem examinations of typhus cases among prisoners. In addition to the usual features, the author notes that fatty conditions

of the serosa, dryness of the muscles and atrophy of the adipose tissue were common. The spleen was either enlarged or normal in size. The original swelling persisted in relapses. The spleen showed a peculiar tint of brown on puncture; it was not particularly brittle, nor was the liver. A waxy degeneration was sometimes seen in the abdominal muscles. Much more rarely there were deeply situated, diphtheritic, necrotic, exanthematous patches in the laryngeal mucous membranes.

Haemoglobin secretion was found in the kidneys, with haemosiderin pigmentation. Similar phenomena were seen in the spleen and to a lesser extent in the liver. Abundance of myelocytes in the capillaries of the medulla of the kidney is also noted. Short remarks on the usual appearances found in complications conclude the paper. The author rightly considers that a pathological, bacteriological, zoological and pharmacological investigation of typhus is needed.

A. P.

FLUEGGE (C.). **Schutzkleidung gegen Flecktyphusübertragung.**  
[Clothing Protective Measures against Typhus.]—*Med. Klinik*.  
1915. Apr. 11, Vol. 11. No. 15. pp. 420-421.

This paper contains an account of measures suggested for combating typhus fever by preventing the attacks of lice that are the transmitting agents. Clothes, bed and bedding need attention. Ointments, ethereal oils, etc., rubbed in as preventives, are often useless. Two alternative measures are suggested. The first, GRASSBERGER'S method, described in detail, is to close completely all openings of garments and thus prevent access of lice to the body. The clothing is so made that as few openings as possible are presented. The lower garments are without openings, are fastened to a blouse or vest which in turn ends in a cowl, which leaves only the eyes free. This garment only allows of access of lice at the neck, waist and arms. All such openings are to be closed by the use of sticking plaster made of starch. The space between the rubber glove and the sleeve is lessened by the use of well closed cuffs, sealed up with strips of plaster. The opening from neck to breast is closed by press-in buttons, and further sealed with plaster. Great difficulty is experienced in closing in the neck, the use of plaster being impossible with bearded men. It is suggested that the collar of the protective clothing should be grooved, the grooves containing fly-glue or canada balsam. Lice could not pass through these sticky substances.

The second method advocated is the use of a very smooth cloth to which lice could not cling, and on which they could not crawl. It is believed that such a substance has been obtained. It is advised that openings in garments should be closed with plaster. Special care is needed in the case of attendants and nurses in prisons, camps, etc., who have to deal with vermin eradication.

A. P.

DELTA (C. G.). **Sur la destruction des poux dans les épidémies de typhus exanthématique.**—*Presse Méd.* 1915. May 20. Vol. 23. No. 22. pp. 175-176.

The author gives an account of the measures adopted to determine means of destroying lice, made during outbreaks of typhus at

Alexandria. The harmful action of strong odours on lice had been suspected during the previous Balkan campaign, and was put to the test methodically in the outbreaks at Alexandria. Lice were exposed to various perfumes in tubes, and the effects noted. It was found that exposure to strong odours, such as that of an inferior but very strong and persistent smelling eau de cologne manufactured locally, was effective in destroying them.

During the outbreaks, the usual measures for disinfection of houses, clothing and persons were adopted, and in addition, washing of the entire body with the eau de cologne mentioned was used.

The main points of the author's conclusions may be summarised thus:—In order to combat the spread of typhus it is necessary, in addition to the disinfection of the infected neighbourhoods, to ensure the removal of lice from all persons in contact with the patients. Change of clothes and of linen is insufficient for this purpose, and it is necessary for baths of proper temperature to be taken. Nits are found attached to the person as well as to the linen, and washing with warm water is insufficient for their removal or destruction. Perhaps the use of strongly aromatic lotions, in which the perfume acts on the insect while the alcohol destroys the nits, may suffice. The destruction of the nits is considered highly important, as nits from infected lice may give rise to infected offspring. However, the epidemiological facts given are stated not to have proved definitely that perfumed lotions of alcoholic bases are efficacious, because the first results may have been due to causes as yet undetermined. However, it seems that the treatment here described merits further testing.

A. P.

TOPELY (W. W. C.). **A Report on a Bacteriological Investigation of Typhus Fever during the Serbian Epidemic of 1915.** *Jl. R. Army Med. Corps.* 1915. Aug. Vol. 25. No. 2. pp. 215-228.

This paper contains the results of the bacteriological examination of some thirty cases of typhus fever at the hospital at Kragujevatz, Serbia. The majority were cases in the second week, with the rash well out and with a temperature between 102° F. and 104° F. A few cases provisionally diagnosed as typhus but presenting no rash at the time were also investigated. Ordinary blood films and thick films were made, also negative films with Chinese ink. Thick film preparations showed a varying number of microorganisms, the commonest being a long bacillus of the *Bacillus fusiformis* type. This, however, was found to be present in non-typhus cases. No appearances suggesting the presence of protozoal organisms were seen.

Cultures were made of eight clinically typical cases of typhus, the majority of the cases so examined proving fatal. The blood was obtained from the median basilic vein of the forearm. Cultures were made on broth, aerobically and anaerobically, similarly on agar and ascitic fluid broth and on kidney tissue-ascitic fluid agar (method of Noguchi).

Kidney tissue-ascitic fluid agar cultures.—In two cases, these remained sterile. In three cases, they remained apparently sterile for 14 days, but an opacity developed. At the end of this time a thin cylinder of the culture was removed and added to a tube of broth.

A similar cylinder from a control tube of ascitic fluid agar with kidney was also added to a broth tube. All the tubes were incubated. On the following day the three tubes with typhus cultures were cloudy uniformly, while the control tube remained clear. A flocculent deposit began to form on the second day, and increased in bulk while the supernatant fluid gradually cleared. Films of the deposits stained with Gram or methylene blue showed nothing. Ordinary wet films showed particles suggesting minute cocci or bacilli. It was found that these could be stained with a 2 per cent. solution of watery eosin applied for 20 minutes or more. Attempts to subculture this small organism failed. In three cases cultures prepared as described showed the presence of cocci, and subcultures of them gave cocci and minute pleomorphic organisms in 24 hours.

Broth and ascitic fluid cultures.—In every case a Gram-positive diplococcal organism was obtained. A flocculent deposit appeared above the blood layer and also clung to the sides of the tube. This form of growth seldom persisted in subcultures. Morphologically, the organism is a diplococcus, occurring in clumps or in short chains. Under some conditions it becomes ovoid and then stains easily and is Gram-positive. It grows much better under aerobic conditions. It has been grown on various media. On agar, the growth resembles that of a streptococcus or bacillus rather than that of a staphylococcus. It is somewhat translucent, and has a greyish-blue tinge by transmitted light. On McConkey's medium the growth is very slight. On Conradi and Drigalski's medium, the growth is very poor; the colonies are at first whitish, then become pinkish.

In broth cultures, forms retaining the diplococcal form, but smaller than the original cocci and Gram-negative, appear. These increase rapidly in numbers, but become smaller and lose the typical coccal shape. In saline suspensions, kept at 37° C., the change into the minute Gram-negative organisms takes place rapidly. Large, granular masses such as are found in the broth cultures are rarely seen. In saline suspensions kept at 0° C., the change is almost completely inhibited. The small Gram-negative organisms appear more rapidly on all media under aerobic conditions.

Two examinations of cerebro-spinal fluid were made. One case showed no meningeal symptoms and the cultures remained sterile. In the second case, meningeal symptoms were present, and cultures of the cerebro-spinal fluid yielded the coccus as obtained from the blood.

No bacteriological examinations of the urine were performed.

In conclusion the author discusses the previous bacteriological results obtained in typhus investigations, and points out that many of the workers have obtained organisms that possess "striking similarities." These organisms have been isolated from outbreaks in different parts of the world by different observers. The exact relation of them to one another remains to be determined.

A. P.

PROESCHER (Fr.). *Zur Aetiologie des Fleckfiebers.*—*Berlin. Klin. Woch.* 1915. Aug. 2. Vol. 52. No. 31. pp. 805-807. With 2 text-figs.

The author has examined blood smears from nine typhus cases.



He makes dry smears, fixes in methyl alcohol for ten minutes and then stains for three to ten hours in a 1 per cent. solution of methylene-azur-carbonate to which 1 per cent. carbolic acid has been added. The smears showed more or less numerous, large, oval or unequal shed epithelial cells from the blood vessels. They contained very tiny diplococci and diplobacilli. These were  $0.2\mu$  to  $0.3\mu$ , and occurred either singly, in short chains or in groups. They were rarely found free in the plasma, and very rarely in polynuclear leucocytes. They were not found in control smears of normal blood, and of blood from such diseases as measles, mumps, scarlet fever, cholera and relapsing fever.

The author suggests that these minute bodies are the excitants of typhus, but as they have not yet been cultivated, the test cannot be applied. In favour of their specificity he states that (1) staining only with methylene-azur-carbonate renders them visible, (2) they do not occur in any other disease of known or unknown etiology, (3) their occurrence in shed epithelial cells of bloodvessels has not been observed in other diseases.

Proescher considers that the shed epithelial cells carry the virus of typhus, which is in agreement with FRAENKEL's histological results, the latter worker having shown that the smallest cutaneous arteries underwent changes in typhus unlike those in other diseases, thus recalling periarteritis nodosa. The author considers that the virus is very probably inoculated into the endothelial cells by the bite of the louse.

The nature of the bodies described by PROWAZEK remains an open question. They are smaller than the diplococci and diplobacilli now found. Whether they are quite different structures or cocci undergoing phagocytosis, degeneration products or granules remains to be seen. More work is to be undertaken with a view to elucidating the matter.

Two microphotographic text-figures are given.

A. P.

**ARNHEIM (G.). Ueber den mutmasslichen Erreger des Fleckfiebers.—**

[The Supposed Cause of Typhus.]—*Deut. Med. Woch.* 1915. Sept. 2. Vol. 41. No. 36. pp. 1060-1062. With 2 text-figs.

The author briefly reviews the various theories as to the causative agent of typhus and adds notes on his own observations. His conclusions are as follows:—From the blood, sputum, and urine of typhus patients it is possible to cultivate a bacillus that presents various characteristic features. Whether all the strains of these bacilli are identical with one another is very doubtful, but they can be distinguished from other described bacteria. There is nothing to support the view that the causative agent is a protozoon. On the other hand these bacilli can be found in the various organs, blood, sputum, urine, also in the skin and it is more probable that they are connected with the aetiology of the disease.

With regard to the mode of transmission the writer disagrees with the view that lice are responsible, but is of the opinion that epidemics can be explained on the supposition that the malady is spread through the air by the patients' secretions.

E. H.

**PETRUSCHKY (J.). Bakteriologische Befunde bei Fleckfieber.** [Bacteriological Findings in Typhus.]—*Cent. f. Bakt.* 1. Abt. Orig. 1915. Mar. 13. Vol. 75. No. 7. pp. 497–498.

The author has examined the blood, urine and nasal secretions of a large number of cases of typhus. In the secretions very numerous small rod-like bacilli were constantly present, these forms resembling the influenza bacillus in the irregular form, size and staining reaction.

The secretions resemble those of influenza but contain a very tough slime of the consistency of liquid glue, throughout which occur various kinds of leucocytes often surrounded by blood platelets.

The bacilli do not grow on the ordinary influenza bacillus medium which contains red blood cells, but on ordinary agar, or preferably on nutrose-milksugar-agar. When the bacilli are grown on agar plates after incubation for 24 hours at 37° C. only very few colonies can be seen with the naked eye but on examination with a lens many smaller colonies can be detected. Subcultures can then be made, but it is simpler to let the cultures grow for 48 hours when these small colonies can be distinguished from the larger ones of *Streptococcus* and *Pneumococcus*. Controls made by culturing the secretions from influenza cases gave different results, the colonies of the influenza bacillus not growing in the absence of blood media.

The author is of the opinion that typhus is not transmitted solely by the agency of lice, but considers that the drops of secretion scattered by the patient coughing or expectorating constitute another source of infection. Finally attention is called to the methods of infection in plague and it is suggested that there are two types of typhus, one more septic transmitted by insects, and the other catarrhal, spread by the sputum of infected patients.

[As this article is only a brief preliminary note there is no experimental evidence in support of the various statements, but in spite of the author's opinions, the results of the present war furnish abundant proof that, in the absence of lice, typhus does not spread.]

E. H.

**GOTSCHLICH (E.), SCHUERMAN (W.) & BLOCH. Ueber Serumreaktion bei Fleckfieber.**—*Med. Klinik.* 1915. Nov. Vol. 11. No. 48. pp. 1310–1313.

The principal points investigated by these workers were:—The specific complement fixation reaction between the serum of typhus patients and the specific antigen from typhus fever organs, the non-specific complement fixation between the serum of typhus cases and luetic antigen (Wassermann reaction), the non-specific reaction between typhus serum and extract of normal organs, work on the complement fixation between typhus fever anti-body containing material (convalescent serum) and blood from the early stage of typhus, research on the precipitin reaction between convalescent and diseased serum and on thermo-precipitin reactions between diseased serum and extract of typhus-infected organs.

The following conclusions were reached:—Practical serological investigations may determine whether specific precipitin or complement fixation reactions may be of service in the early diagnosis of typhus fever. The precipitin reaction gave constant negative results.

Specific complement fixation between typhus blood extract and convalescent serum was established from the sixth day of the disease. The reaction only occurs with active serum and non-specific fixation with luetic serum may be established. Typhus serum from the tenth to the twentieth day of the disease gives non-specific complement fixation with luetic liver extract, but not with normal organ extract. Stern's method acts successfully but the original Wassermann method is only successful in the minority of cases. Tables showing the results of each section of the work are given.

A. P.

NICOLLE (C.) & BLAIZOT (L.). *Nouvelles recherches sur le typhus exanthématique. (Conservation et siège du virus. Typhus du lapin, etc.)* - *C. R. Acad. Sci.* 1915. Nov. 22. Vol 161. No. 21 pp. 646-649.

This interesting and concise paper should be consulted in the original by those working on typhus. The main points only can be summarised here. Two strains of typhus exanthematicus have been kept in animals for one and a half years at the Institut Pasteur, Tunis. One strain has already undergone 50 passages through monkeys, lice or guinea-pigs, especially the latter. The second strain, after passing through a monkey, has been kept in guinea-pigs and, at the time of writing, was in its 46th passage. The virus is conserved in guinea-pigs by intraperitoneal inoculation of cardiac blood. The virulence is not modified by passage through guinea-pigs, but seems to be increased in the monkey.

The virus is found in the blood (man, monkey, guinea-pig) and in the spleen (monkey, guinea-pig). In man the cerebro-spinal fluid and the washed red cells are non-virulent. In the guinea-pig, however, the entire blood, and in addition all the organs are virulent during fever. Even after prolonged washing of the vessels in saline solution, until the blood is removed, the spleen, suprarenals, bone-marrow, brain, kidney, salivary glands, pancreas, liver, muscle and intestinal wall are virulent. The authors emphasise this statement. Great virulence is exhibited by the blood during the first two days, and by the organs towards the third day.

On ice the virus lived up to six days, while at 37° C. it lived for two days.

For the first time, the authors have accomplished the transmission experimentally of typhus to rabbits. Details of four passages are given.

The length of the incubation period in animals varies. When the virus is transmitted from guinea-pig to guinea-pig the incubation period is usually rather short, namely 5 to 10 days. In the case of experimental rabbits it is longer, being as long as 34 days in one case. The authors emphasise the fact that it is necessary to take the temperature of the experimental animals for at least 45 days during the possible incubation period.

From an experiment it appears that the blood of a monkey may be infective during apyretic periods.

The authors give a summary which may be translated thus :—

(1). It is possible to conserve indefinitely the typhus virus by passage through guinea-pigs.

(2). During fever, the unknown germ of typhus is present in all the organs, even when the blood is removed therefrom.

(3). The virus remains infective on ice for at least six days, and for two days at 37° C.

(4). The rabbit is sensitive to typhus.

(5). It is necessary to take the temperature of experimental animals after inoculation with typhus for at least 45 days.

A. P.

NICOLLE (Charles) & BLAIZOT (Ludovic). **Passage du virus exanthématique de la mère au nouveau-né.**—*C. R. Soc. Biol.* 1915. Dec. 31. Vol. 78. No. 20. p. 717.

The authors recall that abortion usually occurs in pregnant women suffering from typhus, and that this is the rule with subinoculated guinea-pigs. In one case which they have observed, a guinea-pig gave birth to a living young one, the parent having been inoculated ten days previously with typhus. The mother and the young one were killed after two days. It was found that the blood of the mother and the organs of the young one (spleen and suprarenal capsules) were virulent by peritoneal inoculation of them into other guinea-pigs. The maternal blood gave an inoculation period of twelve days, while the virus from the young had an incubation period of six days.

A. P.

MATTHES (M.). **Ueber die Zahl und die Formen der weissen Blutkörper beim Fleckfieber.** [The Number and Forms of the White Blood Corpuscles in Typhus.]—*München. Med. Woch.* 1915. Oct. 5. Vol. 62. No. 40 pp. 1345-1347.

An account is given of some investigations of the blood of typhus patients. Usually a polynuclear leucocytosis was found but not invariably. Out of 55 cases, 34 showed over 10,000 leucocytes, but only three cases, two of them fatal, had over 20,000. At the height of the disease 80 to 85 per cent. of the leucocytes were polynuclear, while eosinophiles were almost lacking. At convalescence the increased numbers are maintained for some time, but the number of polynuclears diminishes to about 50 per cent., the number of lymphocytes increases and about two weeks after the fever eosinophiles are observed. Leucocytosis with a preponderance of polynuclears is considered to be diagnostic for typhus in doubtful cases.

A. P.

## FEVERS IN THE TROPICS AND DENGUE.

PELLETIER (J.). *Notes sur quelques cas de dengue.*—*Bull. Soc. Méd. Chirurg. Indochine.* 1915. Apr. Vol. 6. No. 4. pp. 143-147.

The author from his experience at the hospital in Haiphong draws attention to the variability of dengue as seen in this part of the far East. He describes four cases. Two of these had acute dysenteric symptoms, one was associated with glycosuria and muscular paralysis, and in the fourth there were multiple subcutaneous abscesses.

In the discussion which followed M. GAUDUCHEAU emphasised the importance of differentiating what were true sequelae from possible concomitant affections, such as diphtheria and dengue, the former predisposing to the latter and evolving subsequently parietic symptoms.

He described some experiments of his own to infect animals with the virus of dengue. A Rhesus monkey aged about a year was inoculated under the skin by a lancet charged with blood taken from the author during the primary fever. By careful observations, it was noted that after two days' incubation the animal lost its appetite and appeared slightly ill and its temperature was increased by one degree for two days. On the third day after inoculation the blood of this monkey was inoculated into a second; this animal was also slightly ill. From the second a third monkey was inoculated but apparently without effect. This last animal was however much older than the two first inoculated. M. GAUDUCHEAU showed how important it is to note carefully small details when carrying out animal experiments and that it is possible to infect monkeys with the invisible virus of dengue, producing in them a mild form of disease.

P. W. Bassett-Smith.

GAUDUCHEAU (A.). *Bacilles trouvés dans le sang au cours d'une fièvre indéterminée.*—*Bull. Soc. Méd. Chirurg. Indochine.* 1915. July. Vol. 6. No. 7. pp. 254-257. With 2 text-figs.

A case was admitted into the military hospital at Hanoi as typhoid fever, but the serum gave no reaction with Eberth's bacillus or paratyphoid B. After death the only intestinal lesion found was in the transverse colon, which showed a patch of congestion. Before death a blood culture was made and two types of bacilli were isolated: (a) A motile single flagellate bacillus obtained from an ox bile medium; this organism was an intermediate between the cholera vibrio and the typhoid group, but it did not liquify gelatine. The author states that it is the first time a single terminal flagellate organism has been isolated from the blood of man. It did not agglutinate with anti-typhoid or anti-cholera serum and was not pathogenic to rabbits, monkeys, or mice. (b) A non-motile bacillus cultivated in broth direct from the blood; on subculture on solid media it appeared as a cocco-bacillus, with involution forms. This did not agglutinate with anti-pest or anti-dysenteric sera, and was pathogenic to rabbits. The specific relationship of these organisms to the disease is uncertain, and further research is required to prove their pathogenicity for man, especially as no diagnosis of the particular form of fever was made.

P. W. B-S.

LE ROY DES BARRES. **Flèvre de Nature indéterminée à type récurrent, guérie par le Néosalvarsan.**—*Bull. Soc. Med. Chirurg. Indochine.* 1914. Dec. Vol. 5. No. 10. pp. 423–431. With 1 chart.

A very interesting case of a relapsing fever is fully described and a detailed chart is supplied. The patient was a native of Hanoi, aged 24, a female of good previous history. There were five acute attacks, the first lasting 15 days, the second 11, the third 4, the fourth 5, and the fifth 3 days; the intervals varied from 9 to 24 days. The temperature fell in each attack by lysis and during the pyrexia there was a definite eruption, often of a deep colour, present on the face and other parts of body. It always came out *after* the onset of the pyrexia, and lasted for about four days, was accompanied by a feeling of heat without irritation, and was followed by slight desquamation. Marked intestinal disturbances were present, vomiting, intestinal hæmorrhage, distension of the belly and severe pains. The nervous system was profoundly affected during the attacks, acute delirium followed by drowsiness being observed.

Careful laboratory research did not discover any cause and therefore the author comes to the conclusion that he was probably dealing with a febrile disease not yet described. Complete cure was brought about by one intravenous injection of neosalvarsan.

P. W. B-S.

OLIVIER (P. H.). **Over een polyglandulair syndroom bij van der Scheer's koorts.** [On a Polyglandular Syndrome in van der Scheer's Fever.]—*Geneesk. Tijdschr. v. Ned. Ind.* 1915. Vol. 55. No. 4. pp. 385–392.

An account of 15 cases of what was apparently an aberrant form of dengue, in which swelling of the salivary glands was the prominent symptom. The author does not seem to have traced any infectivity between the cases.

The symptoms consisted of a febrile attack, often commencing with a rigor and followed by severe headache, pain in the eyes, and pains in the limbs and back. Sometimes there was also fusiform swelling of the fingers. A rash of a scarlatinal type appeared on the face and more exposed parts of the body, which only lasted for a day or two. This rash was succeeded on the last day of the disease by another of a morbilliform type on the trunk and limbs, which quickly disappeared. The temperature remained elevated for from two to six days and then suddenly dropped. The prognosis was uniformly good, though relapses occurred. The author principally insists on the presence of a tumefaction of the parotid and submaxillary salivary glands, with a concomitant tenderness in the epigastrium which he attributes to a concurrent pancreatitis. In some of the cases there was a slimy diarrhoea with fat crystals in the stools. Treatment was merely symptomatic.\*

J. B. Nias.

\* Van der SCHEER's fever is described in CASTELLANI & CHALMER'S Manual: affection of the salivary glands is not mentioned.

SCHUEFFNER (W.). **Pseudotyphoid Fever in Deli, Sumatra (A Variety of Japanese Kedani Fever).**—*Philippine Jl. Sci.* Sect. B. Trop. Med. 1915. Sept. Vol. 10. No. 5. pp. 345–353. With 3 plates.

The experience of this disease during the past five years at Deli in Sumatra has confirmed the observations recorded by the author in a paper in the Transactions of the Bombay Medical Congress (1909). This communication contains no new information.

P. W. B-S.

MURRAY (W. A.). **Low Fever** (Correspondence).—*Jl. Trop. Med. & Hyg.* 1915. Sept. 1. Vol. 18. No. 17. p. 204.

Writing from Chittagong the author states that probably several diseases are entered under this name, yet there are undoubtedly quite a number which agree in detail with the description of the fever set forth in ROGERS' book on "Fevers in the Tropics." In the author's experience the disease is almost entirely confined to European women. Blood cultures have been universally negative but he has found frequently a marked eosinophilia which is not due to intestinal parasites and he has obtained good results from the use of "orsudan" given hypodermically. These results, together with a cure of a case by a single intra-muscular injection of salvarsan, indicate that the disease is due to some protozoal infection not yet discovered.

P. W. B-S.

SPAAR (Eric C.). **Notes on a Case of Fever due to *Bacterium Columbense* (Castellani 1905).**—*Jl. Trop. Med. & Hyg.* 1915. Dec. 15. Vol. 18. No. 24. pp. 281–282.

The patient was a Singhalese woman admitted into the General Hospital, Colombo, suffering from mild fever of one week's duration. There was some pulmonary congestion but the other organs appeared healthy. The temperature fell gradually and the fever ceased on the eighteenth day. The blood gave negative serum reactions for typhoid and paratyphoid A and B, but agglutination with *B. columbense* was marked up to 1/80 on two occasions. The organism was also isolated from the stools. The characters of the organism, as described by CASTELLANI, are set out in full. The irregular reactions to lactose and litmus milk are peculiar, and these render differentiation of the organism difficult, as it may give identical cultural reactions with both para-typhosus B and *B. coli*, but by agglutination and absorption tests the distinction can be made sufficient to establish it as a specific entity and the causative factor of a short fever.

P. W. B-S.

STATHAM (J. C. B.). **Report on a Series of 800 Medical Pyrexias investigated on Behalf of the Yellow Fever (West Africa) Commission at Sierra Leone, from May to September, 1913, with the Inclusion of a Further 300 Cases investigated before the Formation of that Commission.**—*Yellow Fever Commission, West Africa. Investigators' Reports. Yellow Fever Bureau Bull.* Suppl. Vol. 2. 1915. Aug. 18. pp. 353–387.

When appointed by the Commission to report on the fever cases of Sierra Leone, the author at first hoped to be able to make a complete

survey of both civil and military cases, but he found it necessary to confine his observations to the military cases. These included a great variety of races and both sexes, some of whom were residents and others only temporary inhabitants. The 400 Europeans may be looked upon as non-immunes to yellow fever; the Syrians, mostly women and children, and 400 West Indians doubtfully immune; while the 1,200 West Africans would be immune. A total of 1,100 cases of fever were carefully registered. All possible laboratory examinations were made. Five volumes of records were collected and a synopsis of these is given in numerous tables, special attention being given to doubtful cases; a table of 70 of the latter is added to show the thorough methods employed. The children's cases are separated from those of the adults as they are specially difficult to diagnose. Roughly speaking two thirds of them are infected with malaria, but the fever from which they may suffer is not necessarily always malarial.

In the notes of the severest diseases which were found, the author favours the belief that West Africa provides a different "race" of sub-tertian parasite to the rest of Africa and India. He shows that the malarial incidence was at least five times as great among the European troops on Wilberforce ridge, which was surrounded by bush and near native dwellings, as amongst those of Tower Hill, which was anopheles free. No case of yellow fever was observed during the year; typhoid was rare but it probably exists among the West African natives; the presence of dengue and phlebotomus fever is not yet proven; and trypanosomiasis and leishmaniasis at Sierra Leone are very rare. Malaria is still the predominant cause of fever and accounts for over three quarters of the cases of pyrexia. Incidentally, the author from his observations on human and guinea-pigs' blood does not place any reliance on SEIDELIN's bodies as of diagnostic value. He also points out that since the visit of Sir Rubert BOYCE there has been a tendency to "find" yellow fever on the West coast in most cases with pyrexia and transient albuminuria, and he urges that more facts and less conclusions should be recorded.

P. W. B-S.

GABBI (Umberto). *Intorno alle "Febbricole."* [Slight fevers.]—*Malaria e Malat. d. Puesi Caldi.* 1915. Sept.-Dec. Vol. 6. No. 5-6. pp. 239-244.

The author draws attention to the large number of cases of fever occurring in Sicily which are of uncertain origin, and quotes the dictum of BACELLI that to cure the disease it is first necessary to know the cause. Many of the cases are due to glandular tuberculosis, tertiary syphilis, chronic malaria, and intestinal toxæmia. He has for a long time demonstrated that some are due to melitensis infections, infective tonsillitis and articular rheumatism. Liver and kidney diseases account for some, also ankylostomiasis and neoplasms. In every case it is necessary to employ the reactions of Wright, Widal, and Wassermann, but there are a number of cases in which no recognised cause can be found and the organs are healthy, when the disease is due to a neurosis or hysterical phenomenon. He describes three cases of this form. The disease is generally associated with uterine irregularities with dysmenorrhœa, and is found in early married life. The common signs are, irregular mucous reflexes, cutaneous anaesthesia and



hyperaesthesia, mammary or vertebral hysterogenic zones, ovarian pains, and restricted fields of vision. In the first case described, cardiac disease was simulated, in the second pulmonary tuberculosis. The neurosis is better combated by suggestion than by medicines; drugs by the mouth are useless. When the thermometer is constantly used, it is advised that one should be supplied in which the scale indicates a reading much below the real one. In young neurotic married women without children, the disappearance of the fever, and even better, of the thought of the disease, is favoured when the husband, with the advice of the medical man, persists in carrying out this line of treatment.

P. W. B-S.

BLAKE (F. G.). *The Etiology of Rat-Bite Fever.*—*Jl. Experim. Med.* 1916. Jan. Vol. 23. No. 1. pp. 39-60. With 7 plates & 1 chart.

In this paper the etiology and pathology of rat-bite fever are chiefly discussed and the view held by SCHOTTMÜLLER [see this *Bulletin*, Vol. 4, p. 162] that the disease is due to an infection by a streptothrix, *Streptothrix muris rattii*, is strengthened by cultural and pathological evidence obtained in a case under treatment in the Peter Brent Bringham Hospital. The patient was a white woman, aged 67, who had been bitten by a rat on the finger. She was admitted to hospital two weeks later with fever, severe pains, and marked prostration. There was no inflammation about the scar or lymphangitis. The pyrexia was of an irregular character. She developed a finely mottled, reddish, slightly indurated skin eruption on one leg, and a systolic cardiac bruit was noted shortly before death, which occurred 15 days after admission. A blood examination on the first day gave abundant growth of a Streptothrix in both aerobic and anaerobic culture. A second blood culture four days later was negative, but at the autopsy the same organism was obtained from the heart blood as well as from an area of ulcerative endocarditis of the mitral valve. The organism gave positive agglutination reactions with the patient's serum before death in dilutions as high as 1/320. It was very slightly pathogenic for rabbits and white rats and not at all for guinea-pigs.

The Streptothrix isolated in this case differs from all others as yet described with the exception of that described by SCHOTTMÜLLER in his case of rat bite fever, and was peculiar in being Gram negative. The author concludes that rat-bite fever is a specific infectious disease following the bite of a rat, and is due to the *Streptothrix muris rattii*, which invades the blood stream, develops powerful agglutinins and causes pathological changes in the myocardium, kidneys, liver, and adrenals and, rarely, ulcerative endocarditis.

P. W. B-S.

FUTAKI (Kenzo), TAKAKI (Ftsuma), TANIGUCHI (Tenji) & OSUMI (Shimpachi). *The Cause of Rat-Bite Fever.*—*Jl. Experim. Med.* 1916. Feb. Vol. 23. No. 2. pp. 249-250. With 1 plate.

The authors have recently had four cases of rat-bite fever under observation, two of which they were able to examine in detail. The symptoms of all were typical. In the first case systematically studied

they were able by dark ground illumination to demonstrate from the skin showing the peculiar rash definite, actively motile spirochaetes, rather larger than *S. pallida* and smaller than *S. duttoni*. The same kind of spirochaetes were shown to be present in the lymph of a swollen gland from the second case (shown in plate accompanying the paper). Blood and skin tissue of the patient were inoculated into monkeys, guinea-pigs, and white rats; these are stated all to have become infected and were able to transmit the disease.

The two cases were treated respectively with mercury and salvarsan; both recovered. Further investigations are in progress.

P. W. B-S.

REID (Thomas) & RITCHIE (John). **A Case of Rat-Bite Fever.**—*Edinburgh Med. Jl.* 1915. Sept. New Ser. Vol. 15. No. 3. pp. 186-190. With 1 chart.

A case of this rare disease is described very fully. The patient, a female aged eleven, was admitted into Lochmaben Combination Hospital suffering from diphtheria, from which she made a good recovery. Three nights before she had been admitted to the hospital she had been bitten by a rat in the ear. The onset was sudden, giving a definite incubative period of 17 days. The general characters of the disease agreed with those previously reported, but it was noted that "there was an apparent predilection of the toxin for the nerve centres, producing apathetic almost comatose conditions during the attacks, and an abrupt transition to normal in the intervals." The duration of the disease was 51 days and recovery was complete. No infective organism was found in the blood nor was there any eosinophilia.

P. W. B-S.

ODA (Z.). **Two Cases of Rat-Bite treated by Salvarsan.**—*Sei-i-Kwai Med. Jl.* 1915. Oct. 10. Vol. 34. No. 10. p. 52.

The first case referred to was that of a girl bitten by a rat near the elbow. Symptoms came on after 24 days, pain, purple patches, and intermittent fever, etc. The second was a man bitten on the finger his symptoms appeared after 14 days. In both cases two injections of salvarsan were followed by complete recovery. The author describes the drug as being "definitely effective," but it is safer to give it in the intervals between the attack of the fever.

P. W. B-S.

## PAPPATACI FEVER.

SARRAILHÉ (A.), ARMAND-DELILLE (P) & RICHEL fils (Ch.). **Note sur l'épidémie de fièvre de trois jours (Dengue d'Orient) observée aux Dardanelles sur les troupes du Corps expéditionnaire d'Orient.**—*Bull. Acad. Méd.* 1915. Sept. Vol. 74. Ann. 79. (3 Ser.). No. 38. pp. 317-322.

The occurrence of tropical and semitropical diseases among the expeditionary forces in the Dardanelles area is to be expected, either endemically present or brought from without. The authors observed a definite epidemic of "three day fever" which differed in their experience from the dengue like fever common in the far East in that there was practically no eruptive stage and the duration of the fever was shorter. In the description of the cases the likeness to the ordinary phlebotomus fever as seen in Malta and the Adriatic is very close and this diagnosis is favoured by the presence of abundant *P. papatasii* in the area. Attention is drawn in the paper to two very important facts: firstly the prolonged period of asthenia following so short a fever, secondly the predisposition during convalescence to contract other infections as typhoid and paratyphoid B.

The cases began to appear in the middle of June but the number affected is not stated; relapses occurred in 50 per cent. of those attacked, generally four or five days after the temperature had fallen, but sometimes delayed as long as three weeks.

P. W. Bassett-Smith.

HIGGINS (J. T. D.). **Note on Cases of Phlebotomus Fever at an Island in the Eastern Mediterranean.**—*Brit. Med. Jl.* 1916. Jan. 29. pp. 166-167.

A small outbreak of phlebotomus fever is recorded in an island [name not given] in the Eastern Mediterranean, affecting eight persons in the garrison. Seven of the cases occurred between July 21st and August 1st, and six of these were from one house. The seventh case was an officer's servant, who came from another camp and only slept one night in the house; four days later he was attacked with the fever, a definite incubative period of three days. All the men slept on the ground floor, there was a quantity of old rubble round the house, *Phlebotomus papatasii* were abundant and all the patients had been frequently bitten by them. The sleeping place of the men was changed to a room on the upper floor and the broken masonry was cleared and covered with lime. This was effective in stopping the epidemic. The eighth case occurred in an old building which was also infected by the flies and was not used by any other men. The symptoms were of the usual type, producing a marked debility during convalescence.

P. W. B-S.

RANDONE (F.). **La Comparsa di un focolaio di "febbre dei tre giorni" in Siracusa.** [The Appearance of a Focus of Three Day Fever in Syracuse.]—*Malaria e Malat. d. Paesi Caldi.* 1915. Sept.-Dec. Vol. 6. No. 5-6. pp. 247-249.

The author describes a small epidemic of three day fever which occurred in a family group at Syracuse. The spread of the infection from one to the others was very definite, adults and children both being attacked. There was no doubt as to the diagnosis as the symptoms were typical and *Phlebotomus* flies were very abundant at the time. The family had only just settled into a house of recent construction, but surrounded by old ruined walls which are known to be favourable breeding places for phlebotomi.

P. W. B-S.

MARTELLI (Carlo). **La febbre dei tre giorni a Napoli.**—*Riforma Med.* 1915. Oct. 16. Vol. 30. No. 42. pp. 1156-1159.

The author mentions the wide distribution of three day fever and the special frequency in Naples of the disease amongst the soldiers. The general symptoms are enumerated and these are divided into two syndromes, *neuromuscular* and *gastro-intestinal*.

As there are no definite signs or symptoms to fix the diagnosis, this is sometimes difficult, especially when the course of the fever is more protracted than usual, when it may be taken for either rheumatic fever, influenza, malaria, or dengue. In the blood the changes found are generally very marked and are of real assistance in diagnosis. These characters are described fairly fully but are not new. In the Campagna a fever of short duration, coming on rapidly in the summer in a healthy person, which is attended with severe headache, pains in limbs and joints and does not react to salicylate of soda or quinine, is likely to be phlebotomus fever. Short summaries of five cases which were treated in the Military Hospital at Naples are given and a few remarks on the etiology and prevention of the disease terminate the paper.

P. W. B-S.

STOCKER (C. J.). **Sandfly Fever and Bacteriology: Vaccine Treatment.**—*Brit. Med. Jl.* 1915. Oct. 2. pp. 503-504.

Under this somewhat comprehensive title the author reports from memory some observations on an epidemic of fever of a short duration, affecting 180 cases, which he made while in charge of the 79th Carnatic Infantry during their transfer from Bombay to Rangoon. Clinically the cases included three types: (1) sandfly fever, (2) dengue, (3) intermediate forms. Blood cultures were made from 36 of the latter and in five a bacillus identical to that found by ROGERS was isolated. A goat was immunised with this and a sensitised vaccine was prepared, which used therapeutically appeared in some cases to act beneficially. The organism was not pathogenic to rabbits and a monkey. All the British officers were attacked at Rangoon. Mosquitoes (*Culex fatigans* and *Stegomyia*) were abundant, sandflies less so. From the stomachs of the mosquitoes a similar bacillus was obtained but it did not agglutinate with the immunised goat serum.

P. W. B-S.

HOWLETT (F. M.). **A Preliminary Note on the Identification of Sandflies.**—*Bull. Entomol. Research.* 1915. Dec. Vol. 6. No. 3. pp. 293–296. With 2 plates and 1 fig.

It is probable that sandflies will give rise to discomfort among the troops in Southern Europe next summer as they did in the Gallipoli peninsula last year; therefore the author has put together a few notes in the hope that they may be of use to medical officers in differentiating these flies. Three species are dealt with—*P. papatasi*, *P. argentipes* and *P. minutus*. He states that for practical purposes the characters of the egg and newly hatched larva are most valuable, as these can be easily observed by keeping the fly and larva in a bottle and preventing dryness. In the plate the marking of the eggs are clearly shown and also outlines of the larva, which give differentiating characters. Other interesting details about the arrangement of the bristles on the larva and facts relating to the life history of the three species are given. *P. minutus* breeds more or less continuously through the cold weather at Pusa, Bengal. *P. argentipes* larvae hatching out at the beginning of the cold weather may develop either quickly or slowly. *P. papatasi* larvae hatching at the same time will remain as larvae until the next spring.

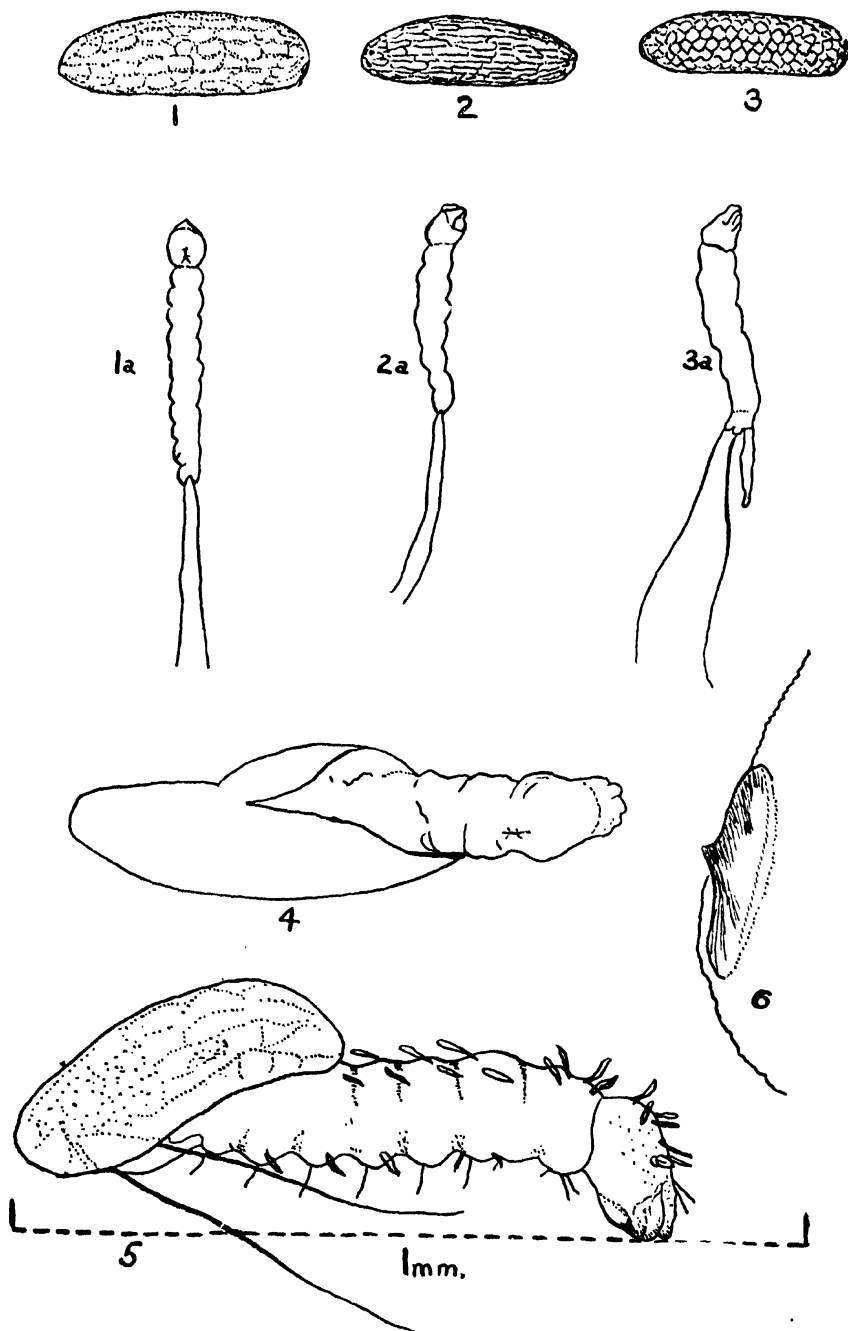
P. W. B-S.

LEGENDRE (J.). **Sur l'existence dans la Somme du *Phlebotomus papatasi*, Scop.**—*C. R. Soc. Biol.* 1916. Jan. 8. Vol. 79. No. 1. pp. 25–26.

*Phlebotomus papatasi* has been recorded from various districts in France. The author on a visit to Vignacourt (Somme) in the early part of July found in a pit a packet of eggs attached to a fragment of floating manure. Some of these developed into insects like phlebotomi, which being sent to M. E. ROUBAUD were identified as *P. papatasi* Scop.

[This fact may be of importance in next summer's campaign.]

P. W. B-S.



EGGS AND NEWLY HATCHED LARVAE OF INDIAN PHLEBOTOMUS.

- Fig. 1 & 1a. Egg and newly hatched larva of *P. papatasi*.  
 2 & 2a. " " " " *P. argentipes*  
 3 & 3a. " " " " *P. minus*.  
 4 & 5. Larva of *P. papatasi* emerging from egg.  
 6. Egg-tooth of same.

## UNDULANT FEVER.

LAFONT (Amédée). **La fièvre ondulante dans ses rapports avec la grossesse, l'accouchement, et les suites de couches.**—*Arch. Mens. d'Obst. et de Gynéc.* 1915. Mar. Vol. 4. No. 3. pp. 97-137.

This very interesting paper deals with a phase of undulant fever which has received comparatively little attention though, as the author shows, important evidence has been collected year by year from many sources. All this information has been put clearly before the reader and at the end of the paper a complete summary of thirty-two cases is given, which is of extreme value. Some remarks are devoted to the methods of serum diagnosis and their difficulties and he quotes a case reported by WEIL and MENARD, where without any clinical evidence the blood agglutinated to 1/760 and even to 1/1,200. In discussing the influence of undulant fever on the genital organs the author notes that symptoms of this are quite common, ovarian pains, dysmenorrhoea, amenorrhoea, menorrhagia, etc. The *M. melitensis* has frequently been found to remain for long periods in the vaginal mucous membrane and contagion during intercourse is quite possible. Mammitis, like orchitis, is a not rare complication. The influence of the fever upon the pregnant woman may vary very much according to the period of gestation, and when the woman is infected. Speaking generally the influence is marked: abortion or premature labour are favoured, particularly during high fever. In some well authenticated cases it has been shown that the *M. melitensis* can pass through the placenta and infants born at term generally show signs of infection and are weakly.

The fever itself does not appear to be altered in character by pregnancy and pregnancy does not give any immunity from the disease. In cases of undulant fever in which labour comes on there is undoubtedly an increased danger from haemorrhage, both from the blood changes and from loss of muscular tone. CANTALOUBE and others believe that after labour the symptoms may become more intense due to lessened resistance. LÉVI and others point to an amelioration more often of the symptoms. Sometimes symptoms like those of puerperal fever may come on and cause much trouble, but generally uterine involution is normal, and the lochia are healthy. Suppuration due to the *M. melitensis* has been described affecting the genital organs, as other parts of the body. The action of the organisms on the mammary gland is important; at first the secretion may appear normal but commonly after a few days it progressively diminishes and WILLIAMS in 1907 first reported the presence of the *M. melitensis* in the milk of a nursing woman. Whether or not the infant acquires the fever by drinking this infected milk is a debatable point; generally the child appears to have a congenital immunity, as early infection is rare. ZAMMIT found this also to be the case with goats and their young. Still it would always be advisable to interdict the woman, whose mammary secretion was infected, from suckling her infant.

[In the paper Bassett-Smith is quaintly written as Basset-et Smith.]

P. W. Bassett-Smith.

**BASSETT-SMITH (P. W.). The Possible Recurrence of Mediterranean or Undulant Fever and its Treatment by Sensitized Vaccines.—***Jl. R. Naval Med. Service.* 1915. Oct. Vol. 1. No. 4 pp. 431-439. With 4 charts.

The author considers it possible that, under war conditions, undulant fever may occur in epidemic form in the Mediterranean area and, after considering briefly the past history of the disease, he points out that Salonika, Constantinople, Beyrout, Smyrna, Alexandria, Cairo, Port Said, Suez, Cyprus, Candia and Malta are known endemic centres. He recalls the fact that inland places may suffer severely and mentions that infection may take place through the skin or mucous membranes, especially in rural districts. Although drinking fresh goats' milk containing the *M. melitensis* or its variety the *M. para-melitensis* is the usual method of infection, there are other ways of acquiring the disease and, just as in typhoid, insanitary camp conditions may lead to its dissemination. In this connection it is worth noting that horses, mules, cows and sheep may all become naturally infected, that milk products may harbour the germ, and that the latter is fairly resistant outside the body. The author lays stress on the occurrence of so-called intermittent types of the disease, where fever may be apparently absent or only slightly in evidence and which yet may be a cause of prolonged ill-health. He warns his readers that infection is present in the Mediterranean and is under control only so long as the necessary preventive measures are taken. These comprise complete medical control of all milk supplies with absolute sterilization thereof, avoidance of local milk products and disinfection of the stools and urine. Notes on vaccine treatment tend to show that the best results are likely to be obtained from the use of sensitized vaccines and two charts demonstrate the beneficial action of vaccines upon the temperature curve. A section of the paper is devoted to *M. para-melitensis*. Algerian goats brought from Spain were found to be frequently infected with this variety of the organism and it is important to recognize that this strain exists in man and to employ the appropriate laboratory tests for it.

A. Balfour.

**OWEN (S. A.) & NEWHAM (H. B.). Notes of a Case of Undulant Fever treated by an Autogenous Vaccine.—***Lancet.* 1915, Sept. 4. pp. 536-538. With 1 chart.

There are few records of cases of undulant fever treated by autogenous vaccines. Hence the one here reported is of particular interest. The patient was a private, aged 23, who had apparently contracted the disease in Malta though he is stated not to have drunk goat's milk. The diagnosis was at first, as is so frequent, very uncertain, and the fact that he had recently been inoculated for typhoid increased the difficulty. In the early stages he was thought to be suffering from pneumonia. The persistence of the fever favoured a diagnosis of typhoid, but the character of the pyrexia with relatively good mental and general condition and a negative Widal made this unlikely. The patient was later admitted into the Albert Dock Hospital where the undulant type of the fever curve, agglutination reactions and isolation of the *M. melitensis* from his blood cleared up



the diagnosis. As no progress was made under general treatment autogenous vaccines were used, a dose of 200 million being given on four occasions at ten day intervals. These were followed by marked signs of improvement on each occasion, though after the last a typical attack of lobar pneumonia developed. Subsequently the man made a good recovery and was discharged to duty. It is noted that the authors in selecting the dose to be given were guided by the early work of BASSETT-SMITH, when 400 million organisms were injected every ten days without producing any bad symptoms; they therefore felt safe in using approximately half the strength employed by him, which gave the satisfactory result here recorded. KENNEDY describes a case treated with autogenous vaccine; in this he found a dose of six to nine million given at short intervals most beneficial. [It is however probable that different strains may vary in toxicity.]

P. W. B-S.

GABBI (Umberto). **Varietà cliniche rare e complicanze nuove nella febbre mediterranea.** [Rare Clinical Varieties and New Complications in Undulant Fever.]—*Malaria e Malat. d. Paesi Caldi*. 1915. July-Aug. Vol. 6. No. 4. pp. 183-188; and *Riv. Crit. Clin. Med.* 1915. Oct. 2. Vol. 16. No. 40. pp. 569-573.

The author refers to the wide diffusion and great increase of reports of undulant fever in Italy between 1906 and 1914, which depends largely upon a better knowledge of the symptoms and complications of this fever. Cases of splenomegaly have already been described; he now gives in full three cases with unusual nervous symptoms. The first case was that of a girl aged 18, in whom the disease was associated with hyperpyrexia and an evanescent lesion of the right upper lobe of the lung; excepting enlargement of the spleen there was no organic lesion; the diagnosis was confirmed by Wright's test. In the second case the fever was accompanied by symptoms of non-organic angina pectoris dependant upon the toxic action of the micrococcus. The third showed multiple chronic muscular spasms (paramyoclonia multiplex), due probably to the toxic action of the organism on the cells in the Rolandic area. This case was fatal. The author refers to the very important experimental investigations of the action of the toxin on the nervous system made by de NUNNO and reviewed in this *Bulletin* [Vol. 6, pp. 164-165].

P. W. B-S.

COZZOLINO (Olimpio). **La febbre mellitense o Mediterranea o ondulante nel bambino.** **Rivista Sintetica (con contributi clinico-epidemiologici.)** [Undulant Fever in Children.]—*Pediatria*. 1915. Aug. Vol. 23. No. 8. pp. 561-567.

This paper contains no new facts. Attention is drawn to the occurrence of cases of undulant fever in children, 41 of which have been recorded. The author adds seven more. The duration varies from 3 months to one year, the mortality being 6 per cent. as against 23 per cent. in adults. An arrested development with mental deficiency is not uncommon. LONGO and others have noticed meningeal

symptoms in young children. For treatment the good results obtained by use of Trambusto-Donzello's serum are noted, but these should be accepted with some reservation owing to the uncertain course of the disease. Experimentally, intravenous injections of 1 or 2 cc. of a one per cent. corrosive sublimate solution have been useful, and also intra-muscular injections of a ten per cent. solution of electargol.

P. W. B-S.

de ANGELIS (G.). **Valore diagnostico dell' emoculturo nella febbre di Malta.**—*Gazz. d. Osp. e d. Clin.* 1915. July 4th. Vol. 36. No. 33. pp. 817-821.

An anomalous case of fever in a resident of Bologna, aged 60, is described, which was variously believed to be an obstinate form of intestinal sepsis or irregular malaria; but no malarial parasites were ever found and ordinary blood cultures on agar gave negative results. The fever commenced in December 1913 and in Nov. 1914 the author suggested a fresh trial by blood culture, using a modification of TIZZONI's method, to clear up the diagnosis. The method consisted in allowing 10 cc. of the blood removed from a vein in the arm to clot, removing all the serum with its bactericidal contents and culturing the clot into fresh broth daily. The serum was found to be sterile but the organism was obtained on the sixth day from the broth of the washed clot. It was of a minute bacillary form,  $0.3 \times 0.8\mu$ , but very pleomorphic, motile but not passing through a sand filter recommended by CARNOT and GARNIER for isolation of *B. typhosus*. Culturally it gave the typical reaction of *M. melitensis* and positive serum reactions. It grew well in defibrinated rabbits' blood and in guinea pig bile broth (1-9), but not in the undiluted sterile bile of the animal. Inoculation experiments into rabbits and guinea pigs showed that it was pyogenic, that its virulence could be greatly increased by passage, and that a culture from one passage in a guinea pig injected sub-durally into a rabbit caused death in 36 hours. The patient's blood reacted up to 1/200 with a type culture of *M. melitensis* and the blood of animals inoculated with the organism isolated from the patient reached an agglutination titre of 1/1,000.

[The isolation of the *M. melitensis* from the blood of a case of undulant fever one year after the onset with an intermittent type of pyrexia is of great interest and importance.]

P. W. B-S.

VERNONI (Guido). **Il primo caso autoctono di febbre melitense nella provincia di Bologna.**—*Malaria e Malt. d. Paesi Caldi.* 1915. July-Aug. Vol. 6. No. 4. pp. 175-183. With 1 text-fig.

The case described is that of a woman aged 23, a native of Forlì. While at Bentevoglia in the autumn of 1914 she suffered from a quotidian fever with sweats, articular and muscular pains, and swelling of the glands under the jaw. The fever with periods of apyrexia continued till April 1915. She was admitted to the hospital at Bologna in February. The spleen was enlarged and hard. Widal's test and examination of cerebro-spinal fluid gave negative results. On 2nd March 10 cc. of blood were drawn off and examined by

Prof. TRIZZONI, who made cultures in broth, hydrocele fluid and on Löffler's blood serum. A minute bacillary organism like that of influenza was obtained and abundant cocci-bacilli and diplococci; these showed active movement but no true motility. The cultured characters are given very fully. The living organism had a specific pyogenic action for rabbits and guinea-pigs whether injected subcutaneously or intra-peritoneally, but when heated to 56°–60° C. it lost its pathogenic and pyogenic action. Serological tests gave positive agglutination reactions at 1/10–1/160. The serum of rabbits after four inoculations agglutinated the *M. melitensis* up to dilution of 1/1,200. Statistics show that the neighbourhood of Forlì has given cases of undulant fever for six years, but it is rather rare or probably the cases are not always recognised. The woman was the only one of the family infected and etiologically it was not possible to exclude in this case infection by milk, though there was not any direct proof.

P. W. B-S.

TONNINI (Luigi). **Due casi di febbre mediterranea nel basso Polesine [Italy].**—*Policlínico*. Sez. prat. 1915. Aug. 8. Vol. 22. No. 32. pp. 1069–1070.

A short description is given of two cases presenting the symptoms of undulant fever. Both were in women but the diagnosis could be proved by the serum reaction in one only. The method of infection was not discovered but there seemed to be no evidence that goats had conveyed the disease, though these were present in the district. An examination of the goats has been undertaken by the local sanitary authority to find out whether they are infected.

P. W. B-S.

SPAGNOLIO (G.). **Note di Patologia esotica. Casi di mastite melitense e sprue.** [Mastitis due to Undulant Fever.]—*Malaria e Malat. d. Paesi Caldi*. 1915. Sept.–Dec. Vol. 6. No. 5–6. pp. 244–247.

Among the subtropical cases occurring in Sicily and studied at the University of Palermo, undulant and “three day” fevers are common but forms of climatic bubo and sprue are occasionally found. The author describes two cases. (1) A female, aged 16; on the fifteenth day of the fever an inflammatory and painful condition of the left breast was noticed, which lasted about two weeks; menstruation was increased and epistaxis occurred. This mammitis is analogous to the orchitis found in man and is probably due to the *M. melitensis* or its toxin. The original diagnosis was confirmed by a serum test on the seventh day, agglutination at 1/200 being obtained. (2) The second case, given in detail, was seen by Prof. GABBI and diagnosed as sprue; the course was long but recovery was complete. No amoebae or dysenteric bacilli were present but a species of *Monilia* was isolated. The patient was a native of Palermo and had previously had good health.

P. W. B-S.

MARTINS PEREIRA (João José). **Um caso de febre de Malta.**—*Med. Contemporanea*. 1915. Oct. 17. Vol. 33. No. 42. pp. 337-339. With 1 chart.

The author describes a case of undulant fever admitted into the Hospital of St. Martha. The patient was a man aged 30, a native of Obidos. The fever ran a long course and was of undulatory type; there was marked headache and pains in the limbs, persistent especially during the febrile attacks. Progressive anaemia was induced and relative blood counts showed a high percentage of lymphocytes. The diagnosis was confirmed by BETTENCOURT by agglutination reaction with the *M. melitensis*. The differential diagnosis from malaria, typhoid, and paratyphoid fevers is detailed rather fully.

P. W. B-S.

STRACHAN (P. D.). **Undulant or Malta Fever in South Africa.**—*South African Med. Rec.* 1915. June 26. Vol. 13. No. 12. pp. 171-178; July 10. No. 13. pp. 186-191; July 24. No. 14. pp. 204-211.

The author gives a very full and interesting description of undulant fever in South Africa from his unrivalled personal experience. He was fortunate in having the constant cooperation of Lt. Col. BIRT, Major BUIST, McNAUGHT and others, who assisted in the laboratory examinations for diagnostic purposes. He draws attention to the fact that the disease was notified in Cape Colony under the term undulant fever as long ago as 1907, but the first probable cases were described by Dr. Simon FRASER in 1898. At Kimberley in 1903 it was known as camp fever; the name however included both typhoid and paratyphoid infections. On his first starting practice at Philippolis in the Orange Free State there was considerable difficulty in getting a laboratory confirmation of a clinical diagnosis owing to the absence of a reliable culture of *M. melitensis*. The author refers to Dr. GARROW's experience of an epidemic of the fever in Steytlerville, Cape Colony, in which cases with little or no fever were frequent, but it is impossible to prove that these ambulant cases have *never suffered from fever*. In African practice the author points out how a case may be seen in the morning, with a normal or subnormal temperature, and then not again for weeks, which demonstrates the importance of care in diagnosis and the use of serum reactions. His analysis of the chief symptoms from 268 cases is found to agree fairly closely with that of EYRE, but headache as a symptom is much less common in South Africa than in Europe. Dr. Strachan insists on the importance of the appearance of the tongue as a diagnostic feature, typically clean, red at tip and edges, and elsewhere covered with a light silvery fur. He discusses very fully the cold abscesses which appear late in the disease (in 1·8 per cent. of his cases), which simulate closely tubercular disease, and are probably often secondary tubercular foci in constitutions broken down by prolonged attacks of this debilitating fever. Symptoms of meningitis or cerebritis were rare; notes of three cases are given, one in a child aged nine.

Frequent reference is made to earlier papers by BIRT and the author and much detailed information is given with regard to methods of serum diagnosis, 1/10 being taken as a safe dilution. It is noted that the serum loses very markedly its agglutinins by keeping.

A serum six weeks old agglutinated at 1/12,000, eight weeks after at 1/8,000, two years later 1/600 (BIRT). Contamination with other bacteria did not prevent the reaction! The average agglutination value of serum in negroes is less than half that of whites, while the percentage of blood cultures was a little higher than in whites. Cultures were obtained from two samples of blood which gave no agglutination, while two with titres of 1/4,000 and 1/5,000 both gave cultures; in the latter there was only one colony which appeared on the 41st day. The *M. melitensis* can therefore live for weeks in serum containing powerful specific agglutinins. All agglutination tests are stated to have been efficiently controlled; living cultures were considered by BIRT to be less reliable than dead ones, the microscopic method apparently being preferred, though sedimentation was also used if time permitted. Many of the samples were tested by BIRT in England as well as by others in South Africa. Cultures were often made from blood clot planted on glucose nasagar litmus agar. The agglutinins persist for a long time after recovery, (according to BIRT and LAMB for seven years). A rising agglutination curve points definitely to present infection; on the other hand in the absence of clinical signs a weak positive reaction may indicate nothing more than a past infection; this requires careful consideration before vaccine treatment is instituted. *The culture of M. melitensis used should not agglutinate normal serum or that of other diseases in a ten fold dilution.* A negative reaction with presence of fever is strong evidence against the disease being undulant fever.

The association of the disease in South Africa with presence of infected herds of goats is definitely proved, and many examples are given, but for detection of animal infection the milk test was given up by the author, being very unreliable in comparison with the serum test. Much difficulty was at first experienced in convincing the population as to the danger of goats' milk, but this is now generally recognised. At Steytleville, which is 2,000 feet above the sea level, there was a severe epidemic both among the people and goats, the latter in the district being estimated at 260,000, the greater proportion of the *Angora* breed. Out of all the goats tested by the author in South Africa less than 10 per cent. gave positive reactions with a 1/10 serum dilution. There was no doubt that some of the cows at Steytleville were infected. He states that *it is not unlikely that South African farmers and their families* sometimes become infected by the dust in and about the goat kraals, which are built quite close to the dwelling houses. The cows are often confined in the same building at night with the goats and from the soil infected by the urine of diseased goats they become infected. He notes that goats in South Africa are not now bred for their milk but for their flesh and wool, so that the peculiarities attending the Maltese goat in Europe do not hold good for South Africa. The seasonal incidence of the disease in South Africa is greatest in the hot months of December, January, and February; during the dry summer months cows' milk is scarce and goats' milk is more likely to be used. In the early winter the goats are pregnant and dry and the month of August is the only one in which no fresh cases were found by the author.

A few prophylactic rules are given. Since 1908 in his district there has been a steady decrease of cases due to more general knowledge

among the people of the cause. There is a small error in page 209, "improbable" being used instead of "probable" in reference to the milk being the source of infection to the troops in Malta.

P. W. B-S.

de KORTE (W. E.). **Some Notes on Malta Fever.**—*South African Med. Rec.* 1915. Aug. 14. Vol. 13. No. 15. pp. 220-223.

In the chronic cases of undulant fever as seen by the author in South Africa there is generally a marked but slight fibro-cellular oedema. He suggests that the nerve symptoms which frequently accompany the disease may result from epi- or peri-neuritis due to oedema of the fibrous sheaths of the nerves. He states that examination of the blood shows an increase in the mononuclear cells and a decrease in the polynuclear in the early stages, but that in the chronic conditions there is an increase in the latter and decrease in the former cells [this is directly contrary to what has usually been observed elsewhere]. He also states that in Africa the urine in most cases has a very unpleasant odour and that apparently there is a diminished quantity passed. During convalescence under vaccine treatment the quantity is markedly increased and the smell is less offensive. He advocates very strongly vaccine treatment but this must be continued, and he states that forty or fifty hypodermic injections are not a high price to pay for a cure; many cases however do not require so great a number. A cessation of treatment before immunity has been reached is followed by a relapse; an injection given every three or four weeks will generally prevent recurrences. Small doses up to 20-30 millions, should be given at first every third or fourth day; after four or five the dose is increased to 40-50 million and the interval extended; when improvement is marked 75-100 million may be given once a week. After about six weeks one may expect permanent improvement, though relapses do occur. Generally speaking, with vaccines the lowest effective dose is better than the higher ones.

[It is a pity that the term "Malta Fever" should be so continually used for the disease in South Africa where it is often known locally as Camp Fever. In the discussion that followed, the *M. paramelitensis* is erroneously stated to have been called the *Micrococcus brucei* instead of *M. melitensis* Br. Nicolle, and Dr. PRATT stated that sensitized autogenous vaccines often succeeded when the ordinary ones failed.]

P. W. B-S.

VELEZ LOPEZ (L.). **La Melitococia en la Provincia de Trujillo.** [Malta Fever in the Province of Trujillo (Peru).]—*Cronica Med.* Lima. 1914. Feb. 28. Vol. 31. No. 604. pp. 58-62 With 1 chart.

A note of a typical case of Malta fever, observed by the author, in a woman who lived on a goat farm and had been in the habit of drinking goats' milk. *Micrococcus melitensis*, in a state of pure culture, was obtained from blood taken from the saphenous vein. The experience has enabled the author since to diagnose other cases in his practice. Malta fever was first recorded in Peru by BARTON of Lima.

J. B. Nias.

## PLAGUE.

CREEL (R. H.). **Epidemiology of Plague in New Orleans.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1915. Sept. Vol. 3. No. 3. pp. 122-143.

An account is here given of the outbreak of human plague which commenced in New Orleans in June 1914 and lasted until the month of October in the same year. In all, 30 cases occurred with a low mortality of 33 per cent. The origin of the epidemic is unknown. Rodent plague was demonstrated after a week of intensive trapping on the 12th July and the last rodent case (at the time of writing) occurred on April 24th, 1915.

With regard to the epizootic, some points of interest arise in connection with the latency of infection among the rodent population. At one focus, the first infected rat was trapped on the 28th July, the second on the 4th August, and then followed an interval of 51 days before the trapping of the third infected rat took place on the 24th September. At another focus intervals of between one and two months occurred between the capture of infected rats. In yet another case, five months elapsed between the capture of infected rodents, no infected rat being discovered within a half mile radius during the interval. The probability of the retention of *B. pestis* in the body of the flea for such extended periods of time, without occasioning rodent plague, is disregarded [but see BACOT, this *Bulletin* Vol. 5, p. 393], and the suggestion is made that the infection may have been carried over by rats suffering from "resolving plague," the organisms possibly being harboured in the cutaneous tissues.

If there is a sufficient number of rats in a building to accommodate the flea population, human inmates are afforded relative immunity from plague, regardless of rodent infection. As the rat population decreases, the number of fleas per rat increases, and when the rodent hosts are not sufficient in number or are not readily available to the cast-off fleas, human beings become liable to attack. From the practical point of view, therefore, all means of rat destruction should be accompanied by flea destruction (spraying with pulicidal solutions and rat proofing; the rat burrows being sealed by concrete flooring).

R. St. John Brooks.

LAFONT (A.). **Une épidémie de peste humaine à Dakar (avril 1914 - février 1915).**—*Bull. Soc. Path. Exot.* 1915. Nov. Vol. 8. No. 9. pp. 660-680.

An account is here given of a virulent epidemic of plague which occurred among the natives of Dakar during the years 1914-1915. Whole families were blotted out by the disease; in the village of Yoff, 15-17 kilometres from Dakar, for example, four-fifths of a population of 1,200 souls succumbed to the disease. A large number of the cases appear to have been pneumonic in origin.

R. St. J. B.

**van LOON (F. H.). Een geval van reïnfectie bij pest.** [A Case of Plague Reinfection.]—*Geneesk. Tijdschr. v. Ned. Ind.* 1915. Vol. 55. No. 4. pp. 474-477. With 1 chart.

The patient, an Indo-European aged 18, was picked up by the Toeren ambulance on the 6th December, 1914 and brought to hospital. He had been taken suddenly ill on the 4th December with symptoms of bubonic plague. The bubo was situated in the right inguinal region, a pure culture of *B. pestis* being obtained therefrom. The patient made a rapid recovery and was discharged cured, on the 29th December 1914. The interest of the case lies in the fact on the 23rd July 1914 the patient had reported sick and was found to be acutely ill with symptoms of pneumonic plague, examination of the sputum for plague bacilli being positive. On this occasion, also, he made a good recovery, a second examination of the sputum, one week later, being negative. The question, was the second infection the result of reinfection or recrudescence? remains unanswered.

R. St. J. B.

**SEEMANN (William H.). Experiences in the Treatment of Plague in New Orleans, La.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1915. Nov. Vol. 3. No. 5. pp. 281-288. With 3 charts.

Twenty-four cases of plague were given serum treatment at the Emergency Hospital of the Board of Health of the City of New Orleans. The treatment was based on the Yersin serum as produced by the Pasteur Institute of Paris. Eighteen cases received serum and of these only three died. In two of these fatal cases a hopeless prognosis was held out from the first. [As there was no adequate series of control cases which did not receive serum treatment, it is difficult to appraise the value of the results obtained in the series of recoveries.]

R. St. J. B.

**CROWELL (B. C.). Pathologic Anatomy of Bubonic Plague.**—*Philippine Jl. Sci.* Sect. B. Trop. Med. 1915. July. Vol. 10. No. 4. pp. 249-307. With 5 plates.

This paper embodies the author's observations on 75 cases of bubonic plague autopsied in Manila between June 1912 and June 1914, and from this somewhat extensive series important and interesting conclusions have been reached. From the pathological standpoint Crowell has come to the conclusion that only two main types of plague should be recognised: namely, the primary bubonic and primary pneumonic types. The former may be subdivided as follows, in order to give prominence to the features most commonly encountered: (1) Uncomplicated bubonic plague; (2) Bubonic plague (with early septicaemia or without superficial buboes); (3) Bubonic plague (secondary pneumonic type); (4) Bubonic plague (secondary meningeal type); and (5) Bubonic plague (secondary cutaneous type). "To follow this classification to its logical conclusion, those types in which focal hepatic or renal lesions are present should also be separated, but this would serve only unduly to complicate the classification, especially as these types do not present prominent clinical differentiating characteristics."



"Septicaemic plague" is not regarded as a well defined pathological entity, as any case of plague in which the organisms multiply in the circulating blood is a case of septicaemic plague, and thus all cases of fatal primary bubonic plague would be placed in this category.

A careful and accurate description of the gross pathology and histopathology of plague met with in the various affected organs is given under different headings, which are divided into skin, lymphatic glands, pharynx and tonsils, respiratory system, spleen, liver, gastro-intestinal tract, peritoneum, cardiovascular system, nervous system, urinary system, generative organs, pancreas and adrenals.

In the group "Bubonic plague with early septicaemia" are included cases which showed a mixed infection. In three cases the pneumococcus and the plague bacillus were isolated from the spleen; in another a streptococcus and the plague bacillus; in a third a streptococcus, *Bacillus mucosus capsulatis*, and the plague bacillus. These cases were associated with a soft, pulpy, diffuent spleen of dark colour.

The location of the buboes in the 75 cases was as follows:—Femoral 55, cervical 10, axillary 6, iliac 3 and popliteal 1. The study of the cervical buboes was of particular interest in view of the opinion held by some observers that the buccal mucous membrane forms one of the portals of entry of the plague bacillus into the body. In two of these cases the bubo was on the right side, in one case on the left, and in the remaining seven cases both sides were involved. In eight of the cases lesions were observed in the pharynx varying from simple oedema to marked pseudo-membranous pharyngitis and tonsillitis, but there was no evidence to show whether or not the glandular involvement was consequent upon primary pharyngeal infection. It is suggested that the pharyngeal lesion may be secondary to cervical buboes when the portal of entry of the infection is on the cutaneous surface. The following table shows the relation of the cervical buboes, pharyngeal lesions and focal pulmonary lesions:—

Cases with—	Number.	Associated Lesions.			
		Cervical buboes.	Pharyngeal lesions.	Focal pulmonary lesions.	None of preceding.
Cervical buboes ..	10	—	8	6	1
Pharyngeal lesions	11	8	—	7	1
Focal pulmonary lesions ..	13	6	6	—	5

The changes observed in the tonsils were very similar to those noted in primary lymphatic buboes, and attention is drawn to the fact that pharyngeal or tonsillar lesions may occur without specific pulmonary involvement. The sputum may be infective, not only in pulmonary bubonic cases with secondary pulmonary involvement, but also in cases of specific pharyngeal lesions.

Two cases of plague meningitis occurred in the series. The first was associated with a primary axillary bubo. No bacteria were found in smears from the spleen, glands and pus from the axilla, but smears

from pus obtained from the right lateral ventricle contained large numbers of organisms, proved to be *B. pestis* by subsequent experiment. In the second case the central lesions were associated with cervical retropharyngeal buboes, bronchopneumonia and acute parenchymatous degeneration of the viscera.

R. St. J. B.

**SWELLENGREBEL (N. H.). Onderzoekingen over pestbesmetting buiten de ratten en hunne vlooiën om.** [Enquiry concerning Plague Infection of Rats apart from their Fleas.]—*Geneesk. Tijdschr. v. Ned. Ind.* 1915. Vol. 55. No. 4. pp. 359–384. With 3 plates.

The general result of these experiments bears out the conclusions arrived at by the Indian Plague Commission, who conducted similar investigations during their researches on plague transmission. The chance of contact infection was found to be small, 1 out of 8 (12½ per cent.) guinea-pigs becoming infected by means of grossly contaminated urine rubbed on the surface of the abdomen, while 41 out of 43 control animals (95 per cent.) succumbed to a single inoculation test with infected *Xenopsylla cheopis*. When the floor of the cage had been infected within 15 hours of the experiment and when the guinea-pigs were suffering from wounds in the feet or deep scarification of the abdomen infection always occurred. The same applied to new-born guinea-pigs, where infection took place through the umbilicus. All the food contamination experiments attempted proved negative, and no support could be found for the theory that plague may be carried over by ants. The experiments conducted by feeding rats on the bodies of their comrades who had died of plague were not numerous enough to justify conclusions, but the author is of opinion that this mode of infection must be very rare, under natural conditions.

R. St. J. B.

**BLUE (Rupert). Plague Preventive Measures: their Development and Present Status.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1915. Nov. Vol. 3. No. 5. pp. 274–280.

“The keynote of present maritime quarantine procedure in respect to plague is the prevention of access of rodents to vessels and their destruction on board ship, and it is now recognised that a human case aboard ship or fomites are of little or no moment in the transmission of the disease from seaport to seaport.”

The whole question of plague prophylaxis is bound up with the destruction of rodents. It has been ascertained that as soon as the rodent population has been reduced by 65 per cent. human plague ceases, although the epizootic among the rats may be still subsisting.

“In view of the world-wide distribution of plague, and its adverse effect on commerce, it would seem a matter of urgent importance for seaports especially so to change their type of architecture and building materials as to erect permanent barriers against the ingress of rodents. The opportunity to do so has been greatly increased in recent years by the enormous development of the cement industry. In fact, building operations have been practically revolutionized.”

R. St. J. B.

MARKL (J. G.). Ueber Saureagglutination von Pestbacillen. [Acid Agglutination in Plague]—*Cent. f. Bakt.* 1. Abt. Orig. 1915. Sept. 8. Vol. 77. No. 1. pp. 102–108.

This communication is concerned with the question of specific acid agglutination with various strains of plague, and as to how far such agglutination can be considered as an aid to the identification of the organism.

The solutions of acetic acid and sodium acetate containing the falling concentrations of hydrogen-ions were composed according to the well-known formula  $H. = \frac{\text{acid}}{\text{alkaline salt}} \cdot K$ , where K is the disassociation constant

for the acid in question (for acetic acid  $K = 1.8 \cdot 10^{-5}$ ).

0.6 cc. of a three days old plague culture in 7 cc. distilled water were added to 0.3 cc. of the reagent containing the appropriate concentration of H-ions in each of ten tubes. The tubes were then placed in the incubator and examined after periods of 20, 40, and 60 minutes, and subsequently after 6 and 24 hours at the room temperature. It was found that the optimum specific effect was obtained after one hour's incubation. Six strains of pest were employed in pure culture; the results obtained are shown in the table on page 179.

It thus appears that most strains of plague show the optimum agglutination in tubes 4 and 5.

In the next series (p. 180) are shown the agglutination effects with two plague-like organisms isolated from pneumonic plague sputum, *B. pseudotuberculosis rodentium*, *B. Danysz*, *B. avicida* and *B. proteus*.

It is clear that "Pseudo-pest I" and *B. pseudo-tuberculosis rodentium* gave exactly the same zone of agglutination as *B. pestis* itself, the optimum effect being observed in tubes 4 and 5. These organisms cannot therefore be distinguished from plague bacilli by means of acid agglutinations. The other organisms are easily separated—*B. avicida*, for example, which also agglutinates in tube 5, giving agglutinations in the tubes containing higher concentrations of H-ions (tubes 9 and 10). *B. typhi murinum*, *B. suicida* and *B. pecum* (Friedländer) did not give any agglutination with the series in question.

R. St. J. B.

BERLIN (H.). Die Serodiagnose der Pest mit Hilfe der Präzipitations-Methode nach Ascoli. [Sero-Diagnosis of Plague by Means of Ascoli's Precipitation Method.]—*Cent. f. Bakt.* 1. Abt. Orig. 1915. Feb. 15. Vol. 75. No. 5/6. pp. 467–485.

The precipitations were carried out with an antigen prepared from the plague infected organs, the organ pulp being mixed with 5 to 10 times its volume of normal salt solution, heated in the water bath and then filtered till quite clear. Equally good results were given with distilled water. The agglutinating serum used was obtained from the Pasteur Institute and was employed in a dilution of 1–200. The precipitation tubes were incubated at 37° C. and examined for precipitation zoning after 5 and 30 minutes respectively. When the reaction was positive a cloud ring was formed at the junction of the

[MARKL (J. G.)] Plague cultures.—Laboratory strains. Observation time 1 hour's incubation.

Tube.	Approximate H-ion concentration.	Strain "Amphitrite."	Strain "Trieste."	Strain "Gaspich."	Strain "Sponza."	Strain "59."	Strain "Vladessich."
1	1.10 <sup>-5</sup>	0	0	0	0	0	0
2	2.10 <sup>-5</sup>	0	0	0	0	0	0
3	4.10 <sup>-5</sup>	0	0	0	trace	trace	trace
4	8.10 <sup>-5</sup>	distinct (Opt.)	Opt.	marked (Opt.)	almost complete	Opt.	marked (Opt.)
5	1,6.10 <sup>-4</sup>	"	"	"	complete	"	"
6	3,2.10 <sup>-4</sup>	0	distinct	0	"	distinct	"
7	6,4.10 <sup>-4</sup>	0	0	0	"	0	0
8	1,3.10 <sup>-3</sup>	0	0	0	distinct	0	0
9	2,6.10 <sup>-3</sup>	0	0	0	0	0	0
10	5,2.10 <sup>-3</sup>	0	0	0	0	0	0

[MARKL (J. G.)] Plague-like organisms. Observation time 1 hour's incubation.

Tube.	Approximate H-ion concentration.	Pseudopest I.	Pseudopest II.	<i>B. pseudo- tuberculosis rodentium.</i>	<i>B. Danzs.</i>	<i>B. avicula.</i>	<i>Proteus.</i>
1	1.10 <sup>-5</sup>	0	0	0	0	0	0
2	2.10 <sup>-5</sup>	0	0	0	0	0	marked.
3	4.10 <sup>-5</sup>	marked	0	slight	0	0	Opt.
4	8.10 <sup>-5</sup>	complete	0	marked	0	slight	0
5	1.6.10 <sup>-4</sup>	„	0	„	0	marked	0
6	3.2.10 <sup>-4</sup>	„	0	„	0	„	0
7	6.4.10 <sup>-4</sup>	„	marked	0	slight	„	0
8	1.3.10 <sup>-3</sup>	almost complete	„	0	marked	„	0
9	2.6.10 <sup>-3</sup>	0	„	0	„	„	0
10	5.2.10 <sup>-3</sup>	0	distinct	0	„	slight	0

antigen and serum in the tubes. The antigen was present in the organs of animals dead with either natural or artificial infection, and the reaction occurred with fresh as well as with putrid organs; in the latter case, however, with less frequency. The intensity of the cloud was found to be commonly dependent on the amount of plague bacilli contained in the organ. Concentrated serum and extract are necessary for the satisfactory demonstration of the reaction, as negative or doubtful results are apt to arise when dilutions of antigen or antibody are employed.

The reaction is not specific; positive results were sometimes obtained with the controls containing extracts of the organs of normal healthy animals (rat and guinea-pigs). For this reason the new method cannot take the place of the ordinary methods of bacteriological diagnosis of plague, and can only be regarded as means of additional investigation.

R. St. J. B.

**DUITSCHENKO (I. S.). Ueber die Bedingungen welche Polfärbung, Polymorphismus und ein eigentümliche Art von Involutionsformen bei den pestähnlichen Bacillen hervorrufen.** [The Conditions which determine Polarstaining, Polymorphism and Involution Forms among Pseudo-Plague Bacilli.]—*Cent. f. Bakt.* 1. Abt. Orig. 1914. Dec. 10. Vol. 75. No. 3. pp. 264-272.

An organism resembling Pfeiffer's "Kapselbacillus," previously isolated from white rats, was used in these experiments. Under favourable conditions for development, a very delicate continuous endo- and ecto-plasm could be demonstrated, but with the occurrence of unfavourable conditions for development in the medium (e.g. incubation for 10 to 12 days at 1-2° C.), the outer part of the ectoplasm forms into a firm capsule, which serves the organism as a means of protection against adverse influences. The capsule acts probably as a dialysing membrane between the cell contents and the surrounding medium and is responsible for the increase of intracellular pressure observed. This increase of pressure leads on the one hand to the formation of the pleomorphic attenuated form of the bacillus, and on the other hand to the displacement of the endoplasm towards the poles of the bacterial cell. Continuous pressure leads to the formation of the various misshapen involution forms met with.

R. St. J. B.

**WHERRY (W. B.). A Plague-like Disease of Californian Ground Squirrels affecting Man in Ohio.**—*Jl. Amer. Med. Assoc.* 1915. Oct. 30. Vol 65. No. 18. p. 1549.

This contains an abstract of a discussion on a paper read by Wherry before the Section on Preventive Medicine and Public Health, American Medical Association, San Francisco, June, 1915, dealing with the plague-like disease of rodents (due to *B. tularensis*) described originally by MCCOY and CHAPIN, and subsequently by WHERRY and LAMB, who isolated the specific organism from two human cases. These cases were characterised by ulcerative conjunctivitis involving the

palpebral conjunctivae, accompanied by lymphadenitis of the preauricular and cervical glands on the corresponding side, a high temperature and marked prostration. Wherry is of opinion that the virus might possibly produce other lesions in man besides conjunctivitis and lymphangitis.

“Human beings might be infected by way of the gastro-intestinal tract and through abrasions of the skin. The virus might give rise to some forms of rhinitis, sore throat, and tonsillitis. Those are the possibilities. I am not at all certain that the virus is virulent enough to produce septicaemia in man. Unfortunately we did not avail ourselves of the opportunity that we had to test that. We should have drawn off some peripheral blood to see if the virus were circulating or not. In one case we took blood rather late, and the results were negative. It seems that the virulence of the virus is diminished by passage through man. Guinea pigs inoculated directly from a human being died after six or seven days; and in three or four days when it came from another guinea-pig; so apparently the virulence is slightly diminished for rodents by passage through man.”

R. St. J. B.

## LEPROSY.

BARBÉZIEUX (G.). **Enquête sur la lèpre tonkinoise, géographie-statistiques.**—*Bull. Soc. Med. Chirurg. Indochine.* 1914. Dec. Vol. 5. No. 10. pp. 408-422.

This paper discusses the question of leprosy in the Province of Thai-binh, Tonkin. The author lays particular stress on the nature of the soil, the climate and the existence of rivers and gives elaborate tables and statistics illustrating their relation, still mysterious, to the distribution of leprosy in the country. The conclusions he arrives at are as follows:—

1. In a population of 945,595 inhabitants, all of the Annamite race, the province of Thai-binh contains at the most 300 lepers [154 are in the asylums], i.e., 3 to 4 per 10,000 inhabitants.

2. Leprosy in the interior of the province is met with principally in the neighbourhood of rivers, not immediately on their banks but rather in the middle of the bends and curves which they form and in the centre of the districts which lie between the streams.

3. Contrary to the general opinion that leprosy is a malady of the coast, it is rare in the regions bordering the sea.

4. Leprosy does not appear to be disseminated in the province by direct or indirect contagion or by heredity. It is not brought from one centre to another, for the lepers rarely leave their original villages; it seems to be *born* and to *develop in the place* under conditions we do not yet know, but which seem to be favoured by the configuration of the ground determining the waters and their drainage.

5. The great majority of the lepers belong to the poorer class, although we cannot invoke poverty as an immediate cause of leprosy.

6. The incomplete nerve-forms of leprosy are those most frequently observed in Thai-binh and this is generally the case throughout Tonkin.

P. S. Abraham.

de AZEVEDO (Paes). **O exame do mucco nasal na pesquisa do bacillo de Hansen.** [Examination of Nasal Mucosa for Hansen's Bacillus.] [With summary in French].—*Arch. Brasil. Med.* 1915. June-July. Vol. 5. No. 6-7. pp. 231-251.

With the object of discovering commencing cases of leprosy, the author examined 59 individuals who lived among lepers in Brazil; but in no case did he ever find Hansen's bacillus in the nasal mucous membrane. In a few of them he observed swollen glands, but on puncturing these he never found acid-resisting bacilli. He further examined methodically and with care 548 persons, some in good health, others suffering from various complaints; but there were no acid-resisting bacilli in the nasal mucous membranes, except in one young girl with scarlatina. The bacilli were grouped in large masses and with difficulty a pure culture was obtained of bacilli which had no analogy with those discovered and isolated by KARLINSKI in similar circumstances. As the result of these observations in a country where leprosy is so common, the author disagrees with STICKER's theory that there is an initial nasal chancre in Hansen's disease.

P. S. A.



NEVE (A.). **A Case of Leprosy diagnosed by X Rays**—*Brit. Med. J.* 1915. Dec. 4. p. 814. With 2 text-figs.

An Indian soldier in the Kitchener Hospital, Brighton, was invalided in April 1915 for supposed rheumatism, headache and other ill defined pains; there was a widespread papular rash with some pigmentation of the face—stated to be of many years' duration. The left eye had been operated upon four years ago for pterygium and there was slight corneal opacity with conjunctival injection. On arrival the face was swollen—attributed to exposure in the trenches.

There was a little clubbing of the fingers, and slight shortening of the toes, one being crooked. There were no maculae on the back or extensor surfaces; no tubercles on eyebrows, ears or elsewhere; no anaesthetic patches on limbs or body; no thickening of the ulnar nerve; no nasopharyngeal ulceration or laryngeal symptoms; and no paresis of lower eyelids.

Radiograms, however, showed entire disappearance of the terminal phalanges and most of the toes with much decalcification of the proximal phalanges and thinning of the distal part of the metatarsal bones; in the fingers, slight changes were perceptible in all the terminal phalanges.

"It is seldom that a case with slight and doubtful general symptoms shows such extensive osseous changes as to make them the decisive diagnostic factor. Hence the value of the Roentgen rays in this case was peculiar."

P. S. A.

JERUSALÉMY. **Myxodème et lèpre.**—*Presse Méd.* 1915. May 2). Vol. 23. No. 22. p. 174.

The author has seen several cases of leprosy in the provinces of Honan and Kiangsu in China showing points of diagnostic interest. A Chinaman, aged 16, presented the symptoms of myxoedema with atrophy of the thyroid, but no macules, pigmentary patches or nodules, or anything symptomatic of leprosy. There was hyperaemia of the nasal mucous membrane and, after giving potassium iodide, Hansen's bacilli were found in the nasal mucus. Both the father and the mother were lepers. The boy complained of general malaise and pains in the joints; thyroid treatment was of no avail, but the symptoms were relieved by alternate doses of chaulmoogra and eucalyptol.

P. S. A.

GOMEZ (Enrique). **La lepra es curable.** [Leprosy is Curable.]—*Rep. de Med. y Cirug.* 1915. Nov. Vol. 7. No. 2. (No. 74). pp. 68-72.

Notes of four cases of leprosy, two being described at length, which after a residence at the leper-hospital of Agua de Dios at Bogotá, lost all signs of the disease. Injections of chaulmoogra oil were used in one of the cases for a period of 18 months, but the nature of the treatment in the other case is not mentioned. The author goes on to remark that the sanitary conditions in the leper hospital referred to are deplorable, and he believes that if they were improved, cases of recovery would be less uncommon. He points out that ankylostomiasis and malaria, by the anaemia which they cause, are potent agents for evil in the case of lepers. More lepers die of tuberculosis than of leprosy in this hospital.

J. B. Nias.

RIBAS (Emilio). **Prophylaxia da Lepra.** [The Prevention of Leprosy.]—*Ann. Paulistas de Med. y Cirurg.* 1915. Nov. Vol. 5. No. 5. pp. 381-394. With 2 plates.

A memoir advocating the establishment of leper colonies in Brazil on the lines of those established in the Sandwich Islands, preferably on one or more islands off the coast of Brazil. The provisions of Brazilian law, as it stands at present, appear to be quite insufficient for grappling with this problem. Charitable institutions exist in Brazil for the treatment of lepers, but the patients can enter and leave at their own pleasure, without the possibility of detaining them.

J. B. N.

FEDERATED MALAY STATES. **Fourteenth Annual Report of the Institute for Medical Research, Kuala Lumpur, Federated Malay States, 1914.** (Henry FRASER, M. D., Aberd., Director.)—1915. Kuala Lumpur: Printed at the F.M.S. Govt. Printing Office. [Leprosy, pp. 6-51.]

*Fish and Leprosy.*—An attempt to cultivate the leprosy bacillus on media prepared from preserved fish seemed worthy of trial; a positive result would demonstrate the possibility of preserved fish being a vehicle for the conveyance of the infection. Numerous experiments were made with "belachan" (dried prawns pounded with salt), "ikan tenggeri" and "ikan slangin" (common forms of salted fish), and dried cuttlefish. At the close of the year there was in no case evidence of growth, or proliferation of bacilli, pieces of leprous tissue and emulsions of the same being used.

*Leprosy and animals.*—During the year 25 inoculation experiments were performed, making the total up to 70—rabbits, guinea-pigs, rats, goats, cocks, fish, and toads being employed. The details of experiments are tabulated; in some cases portions of leproma, in others emulsions were inoculated. In no case has proliferation of bacilli been observed; some of the animals were alive and well after an interval of 17 to 21 months.

*Leprosy and Kedrowsky's bacillus.*—A full account of the attempts to confirm KEDROWSKY'S and BAYON'S results is given, as well as experiments with "Bacillus phlei" and KARLINSKI'S bacillus. [Drs. FRASER and FLETCHER'S conclusions that Kedrowsky's bacillus is not the "leprosy bacillus," and that the latter has not yet been cultivated, have been reiterated in papers already abstracted in this *Bulletin*, Vol. 6, pp. 126 and 407.]

*The Wassermann and Luetin Reactions in Leprosy.*—[Dr. FLETCHER'S Report is also already abstracted in this *Bulletin*. Vol. 6. p. 408.]

P. S. A.

BAYON (H.). **The Artificial Cultivation of Hansen's Bacillus.**—*Ann. Trop. Med. & Parasit.* 1915. Dec. 30. Vol. 9. No. 4. pp. 535-538.

Dr. Bayon, whilst admitting the importance of FRASER and FLETCHER'S negative experiments, points out that similar negative series of experiments have attended the isolation and cultivation of other acid-fast micro-organisms, which have eventually succeeded.

As regards the transmission of leprosy to animals, he observes that "whether one injects ground-up nodules or Kedrowsky's culture, in the great majority of cases the bacteria get simply eliminated, without leaving any visible trace. In single rare instances, they produce bacillary deposits similar to those found in the inner organs of lepers."

"We cannot expect skin lesions in animals inoculated with leprosy: all we can hope for are discrete deposits in the inner organs. If they can be transmitted through some generations and persist for a considerable time, and the bacillary deposit is superior to the quantity injected, then it seems to me that by all the laws of experimental medicine the inoculation has succeeded. This is the case with one experiment fully described in my paper."

He further maintains that "it cannot be too often repeated that the scanty positive results obtained in the experimental study of leprosy are absolutely in keeping with what we know of the clinical features of the disease, its low and eminently capricious infectivity; but that here more than when dealing with any other disease, the partial and incomplete interpretation of hundreds of negative observations cannot invalidate the proof positive of a single successful inoculation."

P. S. A.

SUTHERLAND (W. D.) & MITRA (G. C.). **The Wassermann Reaction in Malaria, Kala-Azar and Leprosy.**—*Indian Jl. Med. Research.* 1915. Apr. Vol. 2. No. 4. pp. 984-989.

The authors review the work of other observers and record their own results in India.

Leprosy.—Thirty-four cases were examined, 32 being inmates of the Purulia Asylum. Fourteen were of the anaesthetic form, and of these, 4 gave a positive and 10 a negative reaction. Of the remaining 20, 7 were positive and 13 negative.

Summing up their own results and those of a number of other investigators, it would appear that about 50 per cent. of lepers give positive reactions, 36 per cent. of anaesthetic and 64 per cent. of nodular and mixed cases.

P. S. A.

STANZIALE (B.). **Neue Untersuchungen über die experimentellen leprösen Läsionen des Kaninchenauges.** [Fresh Experiments on the Production of Leprous Lesions in the Rabbit's Eye.]—*Cent. f. Bakt.* 1. Abt. Orig. 1915. Mar. 13. Vol. 75. No. 7. pp. 498-507. With 2 plates & 2 text-figs.

The author reports the results he has obtained during the last four years in the inoculation of rabbits with leprous material. He found that the injection of ground-up nodules gave no results and therefore tried small pieces of lepromas inserted under the cornea.

After numerous experiments he found that only very few animals developed lesions which could be transmitted to the third generation. With care, however, 42 to 75 per cent. could be inoculated in the first generation, but of these only 25 to 40 per cent. developed the disease sufficiently to be transferred to other animals.

After many failures he obtained from nodules in the eye of one of these rabbits a culture of an acid-fast micro-organism which he considers similar to the bacillus isolated by KEDROWSKY. Its injection into monkeys, rabbits, guinea-pigs and mice produced no leprotic lesions.

P. S. A.

PIMPINI (Antonio). **La cirrosi molle del fegato dei leprosi e le manifestazioni senza bacillo leproso in alcune forme di lepra ereditaria.** [The Soft Cirrhosis of the Liver of Lepers, and the Non-bacillary Manifestations of Leprosy of Hereditary Type.]—*Giorn. Ital. d. Malat. Ven. e della Pelle*. 1915. Oct. 7. Vol. 56. An. 50. No. 4. pp. 281-295. With 3 text-figs.

This paper is in the main an exposition of the views held by Professor CAMPANA of Rome on the subject of leprosy, by one of his pupils. A list of 13 papers by Professor CAMPANA on the subject of leprosy, of dates ranging from 1881 to 1908, is appended. The specialist in leprosy may find something of interest to read in this memoir, but the histological details dealt with are on the whole rather minute and apparently of minor importance. For the general reader the paper is insufficiently illustrated.

J. B. N.

VOERNER. **Zur Kenntnis der Zaraath, des alttestamentlichen Aussatzes.** [Zaraath, the Leprosy of the Old Testament.]—*Dermatol. Zeitschr.* 1915. Aug. Vol. 22. No. 8. pp. 470-478.

The author discusses this question in a very elaborate manner, referring to the theories of many writers as to the identity of the Biblical "Zaraath"—e.g. PROKHOROFF and ZAMBACO Pasha that it was "true leprosy"; HEBRA, "scabies"; CALMET and MÜNCH, "vitiligo"; ROLLET and HAMMONIE, "psoriasis"; DUBREUILLE and BARQUES, a number of skin diseases grouped by Hippocrates under the name "lepra."

The author has come to the conclusion that the disease described in the Old Testament comes under none of the above, but that it referred to an exfoliative dermatitis *sui generis*, which existed as an epidemic for more than 500 years, and has since become extinct.

[No reference is made to the views of McEWEN and UNNA, who have shown that the word "Zaraath" had rather a theological than a medical meaning. See abstract of Dr. MONTGOMERY's interesting paper in this *Bulletin*, Vol. 6, p. 401.]

P. S. A.

## MISCELLANEOUS.

CHRISTOPHERS (S. R.) & KHAZAN CHAND. **Notes on some Anophelines from Arabia and Mesopotamia.**—*Indian Jl. Med. Research.* 1915. July. Vol. 3. No. 1. pp. 180–200. With 2 plates.

The following is a list of anophelines from the Aden Hinterland and lower Mesopotamia, the fourth column giving the synonymy which the authors believe to be correct.

PATTON.	THEOBALD.	EDWARDS.	Authors.	Locality.
<i>A. arabiensis</i> Patton	<i>A. wellcomei</i> Theo.	<i>A. costalis</i> Theo.	<i>A. costalis</i> Theo.	Aden.
<i>A. d'thali</i> Patton	Near <i>A. nili</i> Theo.	..	<i>A. rhodesiensis</i> Theo.	Aden. Muscat.
<i>A. tibani</i> Patton	Near <i>A. theobaldi</i> Giles.	..	<i>A. pretoriensis</i> Theo.	Aden.
<i>A. jehafi</i> Patton	<i>A. cinereus</i> Theo.	<i>A. cinereus</i> Theo.	<i>A. cinereus</i> Theo.	Aden.
<i>A. azriki</i> Patton	..	Near <i>A. multicolor</i> Camboulin	<i>A. turkhudi</i> Liston <i>A. culicifacies</i> Giles <i>A. funestus</i> Giles <i>A. stephensi</i> Theo. <i>A. pulcherrimus</i> Theo. <i>A. sinensis</i> var. <i>mesopotamiae</i> n.s.	Aden. Aden. Muscat. Muscat. Lower Mesopo- tamia.

They point out that the Arabian anopheline fauna is markedly African in character.

These species are described, some at length with notes on habits and discussions on synonymy, others briefly. Plates illustrate *A. sinensis* var. *mesopotamiae*, *A. rhodesiensis*, *A. funestus* var. *arabica*, *A. listoni* and a variety thereof.

There is appended a "Variability chart for certain characters in 81 specimens of the *A. sinensis* group."

A. G. B.

STRICKLAND (C.). **Note on *Anopheles brevipalpis* Roper, and Description of its Egg and Larva.**—*Indian Jl. Med. Research.* 1915. July. Vol. 3. No. 1. pp. 201–204. With 1 plate.

The author has found at the seaside near Selangor, F.M.S., an anopheline which, though it differs in one respect, he believes to be the same as that described by ROPER from Borneo as *A. brevipalpis*. It has a culicine attitude, feeds readily on man, and may prove to be a malaria carrier. He here describes with figures the egg and young larva. It is a member of CHRISTOPHERS' protanopheline group but its exact position therein is doubtful. It is therefore made a new genus, *Memnemyia*, the definition of which is given.

A. G. B.

STANTON (A. T.). **The Larvae of Malayan *Anopheles*.**—*Bull. Entomol. Research.* 1915. Sept. Vol. 6. Pt. 2. pp. 159–172. With 15 figs.

It has been stated, the author writes, that in anopheline larvae the characters are not sufficiently constant to be reliable for the identification of species.

"Recent studies have shown, however, that those differences which were formerly believed to be variations in the larva of a single species, are in reality changes of a constant kind associated with successive phases of its growth and that there is a high degree of constancy in the specific characters of larvae at identical stages of growth. In the examination of many thousands of Anopheline larvae taken in the Malay Peninsula and neighbouring islands, it has been possible to recognise with certainty the larvae of most of the species found in this region. A certain assemblage of characters is diagnostic of the species."

The characters of importance in this respect are "the form and relative position of certain appendages of the cuticle, hairs and similar structures, designed to subserve functions of sensation and the maintenance of position at the water surface for breathing and feeding." The growth changes in anopheline larvae are then described with figures and the remainder of the paper is occupied by descriptions and illustrations of the salient features of the mature forms of known larvae, a method of identification of species being indicated by a synoptic table. The larvae described are those of *A. aconitus* Dönitz (= *albirostris* Theo.); *A. aitkeni* James; *A. asiaticus* Leic.; *A. barbirostris* Van der Wulp; *A. fuliginosus* Giles; *A. karwari* James; *A. kochi* Dönitz; *A. leucosphyrus* Dönitz; *A. maculatus* Theo.; *A. rossi* var. *indefinitus* Ludl.; *A. sinensis* Wied.; *A. tessellatus* Theo.; *A. umbrosus* Theo.

A. G. B.

MACFIE (J. W. Scott). **Observations on the Bionomics of *Stegomyia fasciata*.**—*Bull. Entomol. Research.* 1915. Dec. Vol. 6. Pt. 3. pp. 205–229.

An interesting paper which will be read in full by those who are concerned with this mosquito. The author's studies were made in the laboratory. The sequence of events relating to blood feeding and the laying of eggs was as follows:—

"On the second or third day after emergence from the pupa the mosquito takes her initial feed of blood. If she has previously been fertilised she lays her first batch of eggs on the sixth or seventh day, and is ready to

feed again on blood a few hours later. Thereafter she lays eggs regularly every third or fourth day, and feeds on blood once only after each batch is laid in preparation for the next batch. The female continues to lay batches of eggs throughout her life, and in this way at least fifteen may be deposited. In order that eggs may be laid at all, both fertilisation and a meal of blood are required, and it is necessary that the fertilisation should precede the blood feed. Once fertilised, the female may continue to lay batches of fertile eggs for at any rate 37 days without being reimpregnated. If the eggs are laid in the early morning, she feeds during the day-time: if in the afternoon or evening, she feeds at night; but sometimes she refuses an offer to feed in daylight in favour of the next opportunity to feed in the dark."

Twelve pages of tables are given in support of these conclusions. The author noticed that the development of his larvae, bred in glass bottles, was apt to be arrested. Such larvae appeared to be fully mature and to the naked eye looked quite healthy. Some under observation had been in the larval stage for over three months. In one case the mosquito hatched 100 days after the receipt of the larva. The cause of the delay has not been ascertained; fouling of the medium is suggested.

More experiments were made on the action of common salt on the larvae [this *Bulletin*, Vol. 4, p. 164]. These, which are detailed, "seem to prove that the female *S. fasciata* either will not lay her eggs on 2 per cent. salt solution even when no alternative breeding place is offered to her, or if her natural instinct compels her to do so, the eggs thus laid are rapidly killed by the solution and no larvae result." In less saline media the development of the mosquitoes appeared to be accelerated over the normal.

A. G. B.

MACGREGOR (Malcolm Evan). **Notes on the Rearing of *Stegomyia fasciata* in London.**—*Jl. Trop. Med. & Hyg.* 1915. Sept. 1. Vol. 18. No. 17. pp. 193-196.

In May of 1915 the author received some dried leaves of the West African cotton-wood tree on which were eggs of *S. fasciata*. The leaves had been sent from Sierra Leone three and a half months before, and were in a thoroughly desiccated state. They were placed in tap water at 18° C. and next day the water was crowded with larvae, from which adults have been reared to the sixth generation. Similar observations have been made by THEOBALD and by NEWSTEAD. A number of observations on the life history and habits of these mosquitoes are here detailed for which the paper must be consulted. The author draws attention to the further demonstration of the resistance of the eggs to drying and to the bearing on the spread of yellow fever.

"It is clearly conceivable that dried leaves with eggs attached might, by wind alone, be spread over immense distances, while by export of raw materials in bales of all sorts, dried leaves with the eggs adhering could very well be distributed to the ends of the earth. Moreover, the hardness of *S. fasciata* would permit of its establishing itself in many places where it is not found to-day, and with the vector of yellow fever present, the living virus—if such it prove to be—need only be introduced into the infested area, for the danger of an epidemic to be made manifest."

A. G. B.

STANTON (A. T.). **Notes on Sumatran Culicidae.**—*Indian Jl. Med. Res.* 1915. Oct. Vol. 3. No. 2. pp. 251-258.

Dr. Stanton has examined the mosquitoes collected in Sumatra by the ROBINSON-KLOSS Expedition in 1914 and also collections forwarded by SCHUEFFNER from the Deli, Lampongs, and Batak-Highlands districts. It has been hitherto believed that the mosquito fauna of Sumatra and that of the Malay Peninsula differ considerably; this is partly owing to the fact that the same mosquito has been described under different names by DOENITZ and THEOBALD respectively. The author gives a list of species with notes on synonymy. Of 19 species of anopheles in the Malay Peninsula twelve occur also in Sumatra and the remaining species are rare in the Malay Peninsula.

The anophelines are:—*A. aconitus* Dön., *A. albotaeniatus* Theobald, *A. barbirostris* Van der Wulp, *A. fuliginosus* Giles, *A. kochi* Dön., *A. leucosphyrus* Dön., *A. ludlowi* Theobald, *A. maculatus* Theobald, *A. rossi* var. *indefinitus* Ludlow, *A. schuffneri* Stanton, *A. sinensis* Wiedemann, *A. tessellatus* Theobald, *A. umbrosus* Theobald.

*A. aconitus* Dön. is the same as *M. albirostris* Theobald; DÖNITZ's name has priority. Fifteen species of the tribe Culicini were included in the collections and two of the tribe Sabethini.

A. G. B.

HALBERKANN (J.). **Ueber Schutzmittel gegen Stechmücken.** [Protection against Mosquitoes.]—*München. Med. Woch.* 1915. Oct. 12. Vol. 62. No. 41. p. 1407.

The author refers to a paper in which *Pyrethrum roseum* is recommended as a protection against mosquitoes. He describes some experiments made at the Institut für Schiffs und Tropenkrankheiten at Hamburg, in which a strong tincture of pyrethrum painted on the arm quite failed to deter *S. fasciata* from biting. He believes that none of the odorous substances recommended are of use and that it is necessary to employ a substance which stops the opening of the tracheae. Such a substance is that recommended by GIEMSA in a series of papers and known as "Mückenfluid," which has proved useful in Germany as well as in the tropics; it is sprayed by an apparatus. The fluid at first contained pyrethrum, but now consists of a 2½ per cent. solution of potash soap, or a 1½ per cent. solution soda soap or, better still, a mixture of 50 gm. formalin with 18 gm. spir. sap. kalin. in two litres of water [see this *Bulletin*, Vol. 2, p. 339].

A. G. B.

LIMA (A. da Costa). **Ação do pyrethro sobre os mosquitos.** [The Action of Pyrethrum on Mosquitoes.]—*Brazil Med.* 1915. Oct. 2. Vol. 29. No. 37. pp. 289-291.

The author finds by experiment that the quantity of pyrethrum powder necessary to kill mosquitoes with certainty, when burnt in rooms, should not be less than 15 grammes for every cubic metre of space in a room, the room being closed for not less than three hours, and the roof, in case of apartments without ceilings, being covered with a cloth of canvas or cotton. When only 10 grammes of powder per cubic metre are employed the result is not certain. The powder must be burnt in vessels on the floor.\*

J. B. Nias.

\* BOYCE recommended 3 lb. of pyrethrum to 1,000 cubic feet.



**d'ANFREVILLE (L.).** Note historique à propos des moustiques agents de transmission des maladies.—*Bull. Soc. Path. Exot.* 1915. Oct. Vol. 8. No. 8. pp. 594-595.

The author has taken from a French report of the year 1818 a passage to the effect that the Europeans who were to proceed inland on an expedition from S. Louis were provided with pieces of cloth (*pièces de toile*) to protect them from mosquitoes, it being generally recognised that the insomnia caused by the bites of these insects was one of the principal causes of death among whites on the Senegal river.

A. G. B.

**CASTELLANI (Aldo) & JACKSON (Thomas W.).** Notes on Certain Insecticides.—*Jl. Trop. Med. & Hyg.* 1915. Nov. 15. Vol. 18. No. 22. pp. 253-255.

The experiments of which the present paper treats were carried out in Serbia on body-lice, bed bugs, fleas, head-lice and crab-lice.

"The technique for solids was as follows: Small tin boxes with loose-fitting lids, easily removable, were used. In these boxes were placed the substances to be tested and the living lice or bed-bugs. In the case of fleas, small transparent glass dishes, resembling Petri dishes, were used, as the tin boxes were found unsuitable, the fleas jumping out of them upon opening. Every few minutes the insects in the boxes or glass vessels were inspected and the degree of activity or the death of the insects was noted, with the elapsed time of exposure. The experiments were all carefully controlled. The controls lived for days, more than six days, and were entirely unaffected by simple captivity, so far as could be observed."

It was noted that lice and fleas plunged into a little vaseline died an instantaneous death and that bed bugs died within one to three minutes. The question is raised whether the sulphur and mercurial salts present in ointments generally used for killing lice are not superfluous. The action of lard and lanoline is similar to that of vaseline.

Of gaseous insecticides steam, hot air, and sulphur fumes were employed. Steam was found to kill both lice and their eggs under proper conditions of exposure in a very few minutes. The loss of the characteristic glossy colour of the lice eggs is evidence of death. Clothing must be loosely piled or hung up to permit the necessary penetration and exposure. Sulphur fumigation cannot be depended on to kill the eggs of bed-bugs and lice, though it is highly effective against the insects themselves. Repeated fumigation is therefore necessary.

The authors' conclusions are as follows:—

"(1) In regard to solid and liquid insecticides, the substances which we have found to be deleterious to body-lice (*Pediculus corporis* de Geer 1778) are, in the order of their efficiency: Kerosene oil, vaseline, guaiacol, anise preparations, iodoform, lysol, cyllin and similar preparations, carbolic acid solution, naphthaline, camphor.

"Pyrethrum has a very feeble action on lice, while boric acid, sulphur, corrosive sublimate, and zinc sulphate, when used in powder form, have apparently no action whatever. As regards bed-bugs, kerosene oil is the best insecticide. Next to it comes guaiacol, one of the most active drugs of those we have tried.

"(2) Substances which are powerful liceicides may have very little or no action upon bed-bugs, and *vice versa*. For instance, iodoform which kills lice within ten to fifteen minutes has practically no deleterious action on

bed-bugs, which may live for more than twenty-four hours when exposed to it. It has also very little effect on fleas. Pyrethrum, on the other hand, has a much more powerful action on bed-bugs than on lice.

"(3) For use against lice on a large scale, as among troops and prisoners, perhaps the best insecticide powder is naphthaline. This substance has a lower liceicide action than kerosene oil, guaiacol, iodoform and anise preparations, such as onethol, but it has a less displeasing odour than the first three named, and is much cheaper than onethol powder. In stored blankets and clothing it is also practicable and of use, as frequently lice are found upon the clothing and blankets stored through the summer. Naphthaline is useful also for its well-known deterrent action upon moths. We are speaking here of insecticide powders. As regards liquid insecticides, the American Red Cross Sanitary Commission gave sanction to kerosene by its daily use upon troops and prisoners.

"(4) For the better class of patients in practice a menthol powder is to be preferred to naphthaline in most cases, as its odour is not displeasing, while it is repellent to mosquitoes, in addition to lice and fleas. Such powder is especially useful in summer and in hot countries, as it has a cooling effect on the skin and often prevents prickly heat."

[The authors experimented with powdered precipitated sulphur by itself and mixed with sebaceous human secretion. In each case the result was nil. In Dr. SHIPLEY'S "Minor Horrors of War," pp. 18 and 19, there is evidence that sulphur rubbed into the clothes or in bags worn next the skin is effective against lice.]

A. G. B.

SWELLENGREBEL (N. H.). *Eenige opmerkingen over de bestrijding der kleederluizen*. [Observations on the Destruction of Clothes Lice.]—*Nederl. Tijdschr. v. Geneeskunde*. 1915. Vol. 2. No. 15. pp. 1734-1760. With 1 plate, 1 table & 17 text-figs.

This is one of the numerous papers which are appearing at the present time on the subject of the clothes-louse in connection with typhus fever. It contains a good series of photographs illustrating the development of the insect, and considers in detail the various methods which have been proposed for destroying both the louse and its eggs. From the table given on page 1750 it would appear that exposure to ammonia gas in a closed receptacle is by far the most certain means of destroying the vitality of the eggs.

J. B. N.

LEGROUX (R.). *Sur la destruction des poux*.—*Bull. Soc. Path. Exot.* 1915. July. Vol. 8. No. 7. pp. 470-473.

The author has tested coal tar derivatives and essential oils on the clothes-louse at ordinary temperature (16°), and at 33°, the temperature of the underclothing. The experiments were always made an hour after the lice had fed. The resistance to parasiticide varies according to age, so that, as far as possible, he always used four adults, two lice aged 6-7 days, and four large females. They were put in a bell glass of 2,000 cc. near one point of the circumference on a piece of tissue paper; on the opposite point of the circumference a drop of the liquid to be tried was placed on another piece of paper and the bell glass replaced. As soon as the insects no longer moved and lay on their backs the paper on which the liquid had been placed was taken out and the bell glass closed again. Observations were then kept up

through the glass every half an hour for five hours and then hourly to the 12th hour. A table gives the results at the two temperatures. The author advises the following mixture:—

Lemon grass .. ..	} aa. 300 cc.
Essence of mint .. ..	
Essence of eucalyptus ..	
Powdered naphthalene..	

The lemon grass is obtained from *Andropogon citratus*, the eucalyptus from *E. globulus*, and the mint from *Mentha pulegium*.

For the treatment of garments small pieces of felt or thick cloth 2 cm. square and soaked in the mixture are pinned at various points. If the man has to get back into his clothes a more rapid method must be employed:—(1) Ironing by means of a hot iron, preferably with interior heating. If the clothes are lined, first use a brush soaked in five parts of the mixture and 100 parts of alcohol (50°) and then use the iron. (2) In the case of garments made partly of leather or fur, these are put into a metal box heated to between 40 and 45°; 5 cc. of the mixture for each cubic metre are put on paper at the bottom; 20 minutes is needed for each cubic metre.

For the destruction of nits on the body hairs use the following ointment:—

Parasiticide mixture .. ..	2 cc.
Vaseline .. ..	8 gm.

A. G. B.

**BLANCHARD (R.). La lutte contre les poux. Instructions pour les soldats au front.**—*Ligue Sanitaire Française*. (L. S. F.). 1915. Feb. 20. Bull. No. 3. 8 pp.

A useful note on the various kinds of lice infesting man, the diseases they transmit, and the means of combating these parasites. With regard to head-lice lotions of camphorated alcohol, warm vinegar, either pure or containing 1 per 1,000 corrosive sublimate, pyrethrum powder, or petrol and benzol are all effective, but the treatment should be repeated after two or three days. The same treatment is to be employed for *P. pubis* and the use of grey ointment is condemned as it causes irritation of the genital region and soils the clothes.

With regard to body-lice it is necessary to free the clothes from the parasites and this is best effected by benzine, though fumigating with tobacco is also sufficient to kill them. The above mentioned lotions are also of use for the skin. Eucalyptus is said to be a very useful agent for the destruction of lice in clothes.

E. H.

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## AMOEBIASIS AND DYSENTERY.

## AMOEBIASIS.

ROSS (Ronald) & THOMSON (David). **Studies on Egyptian Sand Amoebae.**—*Proc. R. Soc. Med.* Sect. of Epidemiol. & State Med. 1916. Jan. Vol. 9. No. 3. pp. 33–48.

The authors commenced their research by depositing portions of dysenteric stools, containing blood, mucus, and pathogenic amoebae, on the ordinary dry, sun-baked sand obtained outside a laboratory in Alexandria. There was no trace of the original pathogenic amoebae after two days, but usually on the third day very many actively moving organisms of the *Amoeba limax* type were found on the sand where the faeces had been deposited. Other protozoa also made their appearance, namely, a “balantidium-like” infusorian and certain small mono- and bi-flagellates. These protozoal organisms were proved to come from the sand, as was shown by a series of cultural experiments using sterilised and unsterilised sand.

The protozoa exist in the dry sand in the form of cysts or spores. Abundant motile amoebae and flagellates were obtained from cultures of sand taken at the depth of one foot, but none developed from sand at a depth of four feet. The protozoa were not local in distribution but were widespread. They were more abundant in sand from contaminated neighbourhoods, and cultures from apparently clean districts did not yield protozoa till after those from contaminated ones. Sand blown from the south by the “khamseen” winds has been found to be heavily infected with bacterial organisms. From experiments it is concluded that the amoeba of the *limax* type is not injured by excess of water. No protozoa were cultured from Alexandrian tap-water.

The sand protozoa are generally natural free-living aquatic organisms but some are capable of living a parasitic life in the intestines of man and animals, as they have an affinity for faecal matter which aids their growth and multiplication in the free state. Active protozoa begin to develop from about the fifth day when sterile water and sand are kept in the light in a glass vessel. The first to appear are certain infusoria and flagellates, and also spirochaetes. After a fortnight to three weeks chlorophyllaceous protozoa appear. The source of some

of these organisms has been traced. Amoebae, flagellates and large "balantidium-like" cysts were found in a sample of horse dung taken before it reached the sand. These protozoa grow well in deposits of human faeces on sand. "The horses in Egypt swallow large quantities of sand, sand colic is a common complaint with them, and sometimes causes death. In such cases, if a post-mortem is performed, very large quantities of sand are found in their large intestine. Horses, at least, must therefore act as a kind of culture incubator for several of the sand organisms." The protozoal cysts and spores of Egyptian sand are considered to be derived in part from the faecal contamination of man and animals, and partly from the dried-up sludge of stagnant water which has been dispersed by the wind. The cysts and spores can retain their vitality for months in the dry sand.

Sand simply moistened with bouillon forms a good medium for the growth of some organisms. A layer of half an inch of bouillon inhibits growth, possibly by excluding air. It was also found that deposits of dysenteric stools placed on sand, in which *Amoeba limax* grew well, were distinctly alkaline. They seemed to grow best when the temperature of the laboratory was about 80° F., and grow well at 70° F., or even 60° F., but growth then is slower. In an ice chest at 55° F. no development occurred.

From experiments, it is believed that 1 cc. of sand contained about 100 amoeba cysts. Cultures on agar of dust from a hospital ward gave a growth of *Amoeba limax*, probably derived from the sand. It was also shown that "the ordinary chlorination is insufficient to kill the sand organisms in a mixture of sand and water."

A description of the morphology of *Amoeba limax* is given.

The flagellates observed were pyriform in shape and usually were about 5 $\mu$  in length. Some were uniflagellate, others biflagellate. Temporary encystment under drought conditions occurred.

The "balantidium-like" organism was free-swimming, measured 30 $\mu$  to 40 $\mu$  long, had a large macronucleus and a small micronucleus, and encysted when the medium dried up. Four daughter organisms developed within the cyst.

Kittens injected rectally with sand, or fed on dried up cultures from sand, passed faeces which were negative for protozoa, and showed no symptoms of disease.

The present investigations "have shown clearly that one should endeavour to prevent the contamination of water and sand with faecal matter." Practical suggestions for avoiding soil contamination are given.

"Not only human faecal matter but horse-dung should be disposed of with exceeding great care. Where there is no proper sewage system, the latrines should be dug very deep, or better still, the faeces should be passed into metal buckets and kept thoroughly moist with antiseptic fluid, such as cresol or an emulsion of one of the crude oils. Flies will not land on the contents of the buckets treated in this way, nor will the faecal matter dry up and be blown about. The toilet paper in the buckets should be set on fire several times daily, and the hands should be rinsed in antiseptic lotion after each defaecation. The contents of the buckets should be buried deeply, or, better still, burnt in a destructor. Horse-dung should certainly be burnt. In this way and this alone can dysentery and the flagellate diarrhoeas be prevented, whether for an army in the field or for a civil community."

Shallow latrines are dangerous in dry sand because in them dry faeces may be scooped out and blown about by the wind.

With regard to the danger from flies, it is considered unlikely that flies developing from dead bodies can carry the parasite of amoebic dysentery to food, unless they have previously alighted on dysenteric stools. The proper disposal of faeces, then, means no dysentery. A highly efficient organisation for the thorough and rapid disposal of faecal matter is essential for the prevention of intestinal troubles of protozoal origin.

H. B. Fantham.

GAUDUCHEAU (A.). **Critique de quelques travaux récents sur le rôle pathogène des amibes dans le dysenterie.**—*Bull. Soc. Méd.-Chirurg. Indochine.* 1915. July. Vol. 6. No. 7. pp. 258-267.

The author discusses somewhat fully the more recent work on the amoebae found in cases of dysentery. By a series of comparisons, he considers that hard and fast distinctions between harmless and harmful amoebae cannot be made. Morphological variation among amoebae generally considered to be the excitants of dysentery links them with those usually believed to be innocuous. He criticises more particularly the differential characters of *Entamoeba coli* and *E. tetragena* as set forward by WALKER and SELLARDS (1913). He shows that the differential characters as defined by them break down, or are explicable by reference to other phenomena that are non-specific and of general application, such as conditions of fatigue, abundance of nutritive materials, etc.

The conclusions reached may be thus translated :—

The author desired to show that the most recent experimental proofs of the pathogenic rôle of amoebae (due to WALKER) were founded on insufficient morphological distinctions between *E. coli* and *E. histolytica*, the former being considered harmless, the latter pathogenic. The infection-material used was necessarily impure, and the differential characters being contestable, more work on the intestinal amoebae is needed on a new basis.

It is not yet proved that amoebae are sufficient pathogenic factors alone to provoke the maladies known as amoebiasis.

The activity of amoebae in liver abscess and intestinal ulcer is evident, but may be secondary.

It is not certain that tetranucleate cysts and those with eight nuclei belong to two different species, nor that the eight-nucleate species of Tonkin is the same as that of Europe.

If the ubiquity of a harmless species and of a pathogenic one were established, the latter should be termed *E. dysenteriae* on account of priority over *histolytica*. [But the species *dysenteriae* was insufficiently defined by its creators.]

The cysts with eight nuclei are found in Tonkin in diseased intestines as well as the tetranucleate forms. There is, then, no reason for considering the one harmless and the other injurious, so far as the amoebae of Tonkin are concerned. [Has the author sufficiently allowed for mixed infections ?]

Practically, from the clinical, therapeutical and prophylactic points of view, all entamoebic forms should be considered and treated in the same way.

New work is necessary to determine the real pathogenic effects of the amoebae, and to determine the etiological mechanism of the dysenteries.

H. B. F.

LYNCH (Kenneth M.). **The Rat a Carrier of a Dysenteric Ameba.**—*Jl. Amer. Med. Assoc.* 1915. Dec. 25. Vol. 65. No. 26. pp. 2232-2234.

The experiments began with the feeding of a large brown rat with human faeces containing *Endamoeba histolytica* as well as *Trichomonas intestinalis*. At the end of three weeks the rat was noticed to be getting thin, and to be more sluggish than normal. Emaciation increased and at the end of a month the rat appeared to be very sick and had developed a mucous diarrhoea. The faecal matter when examined fresh and warm contained trichomonads, leucocytes, desquamated epithelium, shreds of intestinal mucosa, red blood cells and numerous active and resting amoebae. The amoebae were "identical with those in the faeces with which [the rat] was fed." The rat died on the thirty-second day after feeding.

Post-mortem the rodent showed "general anaemia, acute mesenteric lymphadenitis, late perilobular cirrhosis of the liver with microscopic periportal abscesses in which no cells like amoebas were found, jaundice of the liver and kidneys." The condition of the liver may have been due to extensive infiltration with cysticerci and secondary infection. There was acute catarrhal enteritis in the small intestine and large intestine. Active and encysted amoebae were present in the caecum, the wall of which "was the seat of an acute ulcerative inflammation practically identical grossly and microscopically with the more acute type of human amoebic colitis." The morphology of the amoeba is briefly described; it measured  $20\mu$  to  $60\mu$ .

These findings brought to the author's mind "the habits of the rat, and his liking for faeces and also for almost any and all of our food and drink." The author continued his experiments and fed twenty rats with human faeces containing active and resting dysenteric amoebae. Four of the rats followed the same course as the first, and exhibited ulceration of the caecum. Faeces of infected rats were fed to other rats, and the latter developed amoebiasis, as did also a normal rat placed in the same cage.

The experimental rats came from a source shown to be free from spontaneous amoebic infection. However, a rat from another source—a negro habitation—showed infection with *Endamoeba histolytica*. A case of human amoebic dysentery had come from the same locality. Similarly infected rats have been obtained from two other localities in Charleston, South Carolina.

The author concludes that:—

"1. The rat (*Mus norvegicus*) suffers from spontaneous amoebic dysentery similar to that occurring in man.

"2. This apparently occurs in endemic foci in Charleston, S.C.

"3. The ameba found in the cases of rat infection here reported are indistinguishable from *Endamoeba histolytica*.

"4. This rat may be infected with *Endamoeba histolytica* by allowing it to eat human faeces containing this parasite.

"5. The disease thus produced is practically the same as that occurring in man and from spontaneous infection in rats.

"6. This infection, spontaneous and experimental, may be transmitted from the infected to the healthy rat by close association, that is, living, eating and drinking together

"7. The rat is a possible and probable disseminator of dysenteric amoebas pathogenic for man."

H. B. F.

BARLOW (Nathan). **Endamebic Dysentery. Relapse after the Use of Emetine.**—*New York Med. Jl.* 1915. Oct. 23. Vol. 102. No. 17. Whole No. 1925. pp. 845-848.

Barlow has had an experience of over 300 cases of dysentery treated with emetine. It is more difficult to get rid of amoebae when flagellates, ciliates or metazoa are present. The mild cases are more susceptible of cure; extensive ulceration harbours the amoebae. Patients with hepatitis or liver abscess are usually free from relapses, partly due to more thorough treatment. The minimum treatment to ensure against relapse is the administration of 1 grain of emetine daily for nine days. At Cuyamel in Spanish Honduras 75 patients who only got 3-6 days' treatment all relapsed without exception. The administration of emetine should not be continued longer than 2-4 weeks, otherwise intestinal irritation will be induced which aggravates the dysenteric condition. The greatest number of cures are obtained when no laxatives are given. The ill effects of the drug are seen after prolonged treatment rather than with large doses. The plan of treatment Barlow considers best is as follows:—

"One grain (or more, for one or two days) is given daily for 15 days, followed by 60-80 grains of ipecac for from 5-20 days, according to whether intestinal irritation is produced or not. The bowels are cleansed by a saline at the beginning of treatment, and about every five days. If there is either diarrhea or colic, it is checked by opiates, usually paregoric, in small repeated doses, until comfort is obtained. . . . On discharge the patient is instructed to return once each month for examination of a fresh stool obtained after a saline cathartic. If either endamebas (of any variety) or cysts of *Endamoeba histolytica* are found, the treatment is repeated."

E. E. Atkin.

Low (George C.). **The Treatment of Amoebic Dysentery.**—*Brit. Med. Jl.* 1915. Nov. 13. pp. 714-716.

This paper comes from the Seamen's Hospital which is attached to the London School of Tropical Medicine, where considerable experience has been accumulated.

Dysentery may be bacillary, protozoal, or helminthic. The vast majority of the cases which have come to England from the Dardanelles are not amoebic. If blood and mucus are being passed while active amoebae are present in the stools, the case should be treated as amoebic dysentery. Later on when the case becomes chronic, cysts make their appearance, and *E. coli* may be excluded by its larger size and increased number of nuclei. *Intravenous* injections of emetine should be given when time is important. In chronic cases, when it is not necessary



for the patient to be in bed, the drug may be given in keratin capsules by the mouth. Methyl emetine (Burroughs Wellcome & Co.) does not seem to be more efficient than the hydrochloride, but was only tried in a few cases. Severe cases should receive 1 grain subcutaneous or intramuscular injections, morning and evening for two or three days; afterwards 1 grain every night until 12 grains in all have been given. One may begin with single daily doses in less severe cases. This will speedily relieve the symptoms. If blood and mucus recur, a second course of treatment, consisting of grain injections every night for six nights, is administered. A third course is practically never necessary. A case treated by the author is referred to in which disappearance of the cysts was brought about by a course of emetine. Chronic cases and carriers should be treated in the same way as acute cases. Emetine works wonderfully in cases of liver abscess, often causing complete abortion of all the symptoms. There is a small residuum of cases which for some unknown reason are refractory to emetine.

[Some French authors report success with salvarsan when emetine has failed.]

E. E. A.

Low (George C.). **Two Chronic Amoebic Dysentery Carriers treated by Emetine, with some Remarks on the Treatment of *Lambli*a, *Blastocystis* and *E. coli* Infections.**—*Jl. Trop. Med. & Hyg.* 1916. Feb. 1. Vol. 19. No. 3. pp. 29-34.

Cryptic infections with *E. histolytica* are often difficult to diagnose and a differential leucocyte count is recommended by CHALMERS and ARCHIBALD as an important help [this *Bulletin*, vol. 6, p. 444]. An increase in the number of large mononuclears and an eosinophilia are found. Low is inclined to discount the value of these adjuncts to diagnosis because the cases are frequently complicated by malaria and helminthiasis. In addition some of the cases show no abnormality of the blood.

The amoebic carrier is a dangerous person. The cysts he voids cannot resist drying, but live if they gain access to water or moist earth. In towns with good drainage there is probably little danger but an influx of amoebic carriers is a considerable menace to a rural district. It seems definite that people who have never left this country can become infected and develop the acute disease. A case of liver abscess has been described. The question of curing these carriers is therefore all important. Low reports the effect of treating two amoebic carriers with emetine. In the first case it was quickly effective and no return of the cysts was observed during a period of over seven months. The other case was hardly benefited at all by the treatment at first, but the cysts disappeared after a fortnight's administration of the drug.

It is now becoming recognised that *Lambli*a *intestinalis* may cause diarrhoea. Of the drugs that were tried Betanaphthol was ineffectual; methylene blue appeared to diminish the number of cysts but had to be stopped because the patient showed symptoms of poisoning; emetine was useless; kerol appeared to have no effect.

*Blastocystis hominis* is not known to be pathogenic. It is difficult to get rid of by drugs.

*Entamoeba coli* is usually looked upon as a harmless parasite but Low thinks that under certain conditions it may cause diarrhoea. Emetine produced only temporary disappearance of the parasite.

E. E. A.

BAYMA (Theodoro). **L'Adrénaline dans la Dysenterie Amibienne.** [Also in Portuguese].—*Ann. Paulistas de Med. e Cirurg.* 1915. July. Vol. 5. No 1. 16 pp.

The results of the treatment of 10 cases of amoebic dysentery with adrenalin are recorded from Sao Paulo, Brazil. The symptoms abated in periods of time varying from six hours to four or five days after the treatment was started. A chronic case of eight months' standing, in which emetine had not effected a cure, was enabled to go back to work after 10 days' treatment with adrenalin. Another case which had lasted more than three months was clinically cured after a few days, although amoebae were not eradicated from the stools. Only one of the patients had cysts and these were removed by giving three intestinal washes containing adrenalin at four day intervals. No toxic effects were observed from the use of the drug.

E. E. A.

HAMMACHER (J.). **De behandeling van Amoebendysenterie met onderhuidsche tannine-inspuitingen.** [The Treatment of Amoebic Dysentery with Subcutaneous Injections of Tannin].—*Geneesk. Tijdschr. v. Ned. Ind.* 1915. Vol. 55. No. 5. pp. 550-560.

Owing to the high price and present scarcity of emetin, the author was led to try tannin as a substitute, as recommended by KARTULIS of Alexandria. A two per cent. solution was used, injected into the gluteal muscles, and at first, in consequence of KARTULIS' warning about pain and rise of temperature, the dose was limited to 1 cc. of the solution. It was, however, afterwards found that as much as 2 cc. could be used without harm, each dose thus containing 40 milligrammes of tannin. One injection was given daily for from five to seven days in succession, and the treatment was then stopped, the stools being examined daily for amoebae, and, if the result was negative for a week or more, the patient was regarded as cured, at any rate for the time being. The occasional presence of *Amoeba minuta* in the stools was disregarded, as being a harmless parasite. Out of 35 coolies who were thus treated for dysentery, 22 needed only one course of injections, while five required two or three series, and in the remaining eight cases, the treatment was begun with emetin and completed with tannin.

The author adds a note of warning against employing emetin in doses larger than 6 centigrammes. The exhibition of daily doses of 9 to 12 centigrammes in three cases of dysentery, one being his own, resulted in the production of a rather alarming feeling of weakness in the limbs, and he asks whether in these doses emetin is not capable of acting as a muscle or nerve poison.

J. B. Nias.

**JOB (E.) & ERNOUL (I.). Un cas de dysenterie amibienne autochtone.**  
—*Bull. et Mém. Soc. Méd. des Hôpit. de Paris.* 1915. Oct. 21.  
Vol. 31. 3 ser. No. 29-30. pp. 851-855.

This was a case of a French soldier with amoebic dysentery who did not get better on emetine. He received subcutaneous injections of 4 centigrammes of chlorhydrate of emetine to begin with, followed by 8 cgm. on three successive days, but he died on the day after the last dose.

The authors have experienced similar failures before, almost always in natives of Senegal whose intestines were infected with parasites such as *Trichomonas*, *Lambliia* and intestinal worms. Thymol is particularly appropriate in these cases in conjunction with emetine.

There is another point of interest in the case cited above. Although it was in hospital at Casablanca that the diagnosis was made, a place where amoebic dysentery is endemic, yet the man was admitted to hospital immediately on arriving at that port and his illness dated from the time when he was in the trenches in France. His regiment was a colonial one but he himself had never been abroad prior to his illness. He undoubtedly got his infection from his comrades, many of whom had been in places infested with amoebic dysentery and, although not ill themselves at the time, were carriers of the specific organism. The authors point out this is no danger to France in her colonial expansion. People who have had amoebic dysentery some time previously, on returning from France are often seized with diarrhoea at Tangiers, which becomes dysentery by the time they arrive at Casablanca. The climate is no doubt responsible for this.

E. E. A.

**RENCUREL (J.-E.). Note sur deux cas d'ictère et subictère pré-dysentériques.**—*Bull. Soc. Méd.-Chirurg. Indochine.* 1915. Mar. Vol. 6. No. 3. pp. 68-76.

Post-dysenteric jaundice is not uncommon, but this condition preceding the ordinary symptoms of amoebic dysentery is much more unusual. Two cases are reported.

*Case 1.*—Dysenteric stools appeared on the 15th day of the jaundice which was by this time decreasing. The only symptom which could be attributed to the jaundice was bradycardia. Unfortunately a microscopic examination could not be made and the only thing pointing to amoebic dysentery was the fact that the patient got well on emetine.

*Case 2.*—The patient complained of pain over the liver. Ten days later jaundice appeared. Although amoebae were not found in the stools he was put on to emetine. After about six days of this treatment he suddenly developed diarrhoea and microscopic examination revealed many amoebae, both active forms and cysts. The dysentery proved intractable and emetine had to be continued for 17 days before the patient was cured.

E. E. A.

ELLIOTT (John B.). **Abscess of the Liver.**—*Southern Med. Jl.* 1915. Dec. 1. Vol. 8. No. 12. pp. 1019–1026. With 3 text-figs.

A collection of 116 cases of liver abscess in which the diagnosis was confirmed, occurring in two hospitals in New Orleans. Of these 47 gave a definite history of dysentery, some recent, others many years ago. The large majority gave a history of pain in the region of the liver as the most prominent symptom, 73 recovered, 40 died and 3 deserted. The leucocytosis in 49 cases was on an average 18,000; the average neutrophil count in 59 cases was 79 per cent.

Definite amoebic infection was found in only 25 cases, but probably a careful search of all the cases would have brought it up to 80 per cent. The left lobe was involved in 10 cases. In 7 the abscess ruptured into the lung. All the seven positive cases of multiple abscess died. The most constant symptoms are pain in the liver region, loss of weight and leucocytosis.

E. E. A.

GAUDUCHEAU (A.). **Infection spirillaire d'amibes : pénétration des spirilles dans les kystes. Considérations sur la vie intracellulaire des bactéries.**—*Bull. Soc. Méd.-Chirurg. Indochine.* 1914. Oct. Vol. 5. No. 8. pp. 337–341. With 3 figs.

When cultivating *Entamoeba (Vahlkampfia) phagocytoides* on an almost immobile culture of *Bacillus coli*, the author found that some amoebae contained numerous small microbes showing active movements. These bacteria were considered by him to be in a state of true intracellular, parasitic life, in which condition they undergo modification, their mobility increasing and their dimensions decreasing. Similar bodies have been seen in leucocytes from stools of bacillary dysentery cases. The movements are not due to circulation of protoplasm, but originate in the minute bodies themselves.

Similar parasitism of amoebae by bacteria has been observed in the case of an amoeba, found naturally encysted in the intestine. Three monkeys infected with amoebae showing such hyperparasitism were found. Fresh preparations of the amoebae showed that the outer half of the organism was the principal seat of the swarming of the invading bacteria. The largest of these inclusions was the size of *B. coli* or an ordinary typhoid bacillus, the majority were smaller. Examination of isolated microorganisms near the walls of the cysts revealed the presence of some true spirilla. Certain of these retained their motility for 24 hours at a temperature of 30° C. to 32° C. The thickness of the intracystic spirilla is variable. Thick forms are large and less mobile. Thinner, more delicate ones appear to be the forms that initiate the intracellular evolution of the spirilla.

The author regards the intracellular bacteria and spirilla observed in the living condition within amoebae as being in a state of true parasitism, and thus being capable of producing disease in the amoebae. He suggests that it is one of nature's methods of destroying dysenteric amoebae. Intracellular stages of spirilla should be searched for in such cases of latent spirillosis.

H. B. F.

MACFIE (J. W. Scott). **A Case of Dysentery in a Monkey, in which Amoebae and Spirochaetes were found.**—*Ann. Trop. Med. & Parasit.* 1915. Dec. 30. Vol. 9. No. 4. pp. 507–512. With 1 plate.

A small monkey, *Cercopithecus petaurista*, in which a strain of a human trypanosome had been sent to Accra, died unexpectedly 65 days after inoculation. The monkey had suffered from diarrhoea. At autopsy the large intestine was found to be congested and studded with ulcers, which were most numerous near the caecum. In fresh preparations of the contents of the large intestine many active amoebae were seen. They usually measured  $12\mu$  to  $15\mu$  in diameter, but some reached  $30\mu$  and contained ingested red corpuscles. Cysts were also present which usually measured  $12\mu$  to  $18\mu$  in diameter, but some attained  $33\mu$ . The cysts had a thick wall and contained a large vacuole. The number of nuclei varied greatly but generally several were present, while in one cyst eight nuclei were counted. In sections amoebae were seen at the bases of the ulcers. The author compares the parasite with various other entamoebae described from monkeys which were usually healthy. He considers that the organism is different therefrom, and suggests the name *Entamoeba cercopitheci*.

Large numbers of minute spirochaetes were also seen in smears of the contents of the large intestine and rectum of the same monkey. The spirochaetes were very slender and had pointed ends. They varied in length from  $4\mu$  to  $7\mu$ . In morphology they resembled *Spirochaeta eurygyrata* found by WERNER in 1909 in healthy human faeces. The present author has also seen similar parasites in enormous numbers in the faeces of two patients at Accra who were suffering from diarrhoeic symptoms.

H. B. F.

ESCOMEL (E.). **A propos d'un phénomène biologique de l'amibe dysentérique.**—*Bull. Soc. Path. Exot.* 1915. Oct. Vol. 8. No. 8. pp. 573–574.

The author shows that *Entamoeba histolytica* will not engorge the red corpuscles of a person taking emetine, but will readily engorge those of a normal person. Thus emetine is not only anti-haemorrhagic but also renders the red cells unpalatable to amoebae.

E. E. A.

SMITH (Allen J.) & BARRETT (M. T.). **Further Note upon Comparison of *Endamoeba gingivalis* (Gros) and *Endamoeba histolytica* Schaudinn.**—*Jl. of Parasitol.* 1915. Dec. Vol. 2. No. 2. pp. 54–56.

*Endamoeba gingivalis* possesses a nucleus which is almost invisible in the fresh state. It also exhibits the "throwing off of gemmules by actively moving and apparently normal amoebae," and the authors incline to the view that the gemmules are not degenerate [cf. SCHAUDINN'S account of the development of *E. histolytica*]. They also believe that *E. gingivalis* is distinct from *E. histolytica* because of the "constant failure of attempts to infest the colon with pyorrhea material rich in *Endamoeba gingivalis*." The pyorrhea material

contained active vegetative amoebae and was administered to two kittens by feeding, to two puppies and to two kittens by high rectal enemata, and to four kittens by injection into the colon after laparotomy. *E. gingivalis* is stated to be more haemolytic than *E. histolytica* as well as presenting slight morphological differences such as somewhat smaller size, more lobose pseudopodia and more central nucleus.

H. B. F.

- i. WILLIAMS (Anna Wessels), von SHOLLY (Anna I.), & ROSENBERG (Caroline). **Amoebas in the Mouths of School Children.**—*Proc. New York Path. Soc.* 1915. Mar. N. Ser. Vol. 15. No. 3. pp. 34–37.
- ii. WILLIAMS (Anna Wessels), von SHOLLY (Anna I.), ROSENBERG (Caroline), & MANN (Alice G.). **Significance and Prevention of Amebic Infections in the Mouths of Children.**—*Jl. Amer. Med. Assoc.* 1915. Dec. 11. Vol. 65. No. 24. pp. 2070–2073.

i. The authors point out that it is necessary to seek for early cases of oral amoebiasis. Accordingly, 475 school children between the ages of 9 and 16 years were examined, and 150 representative cases were chosen for further investigation. Two smears were usually taken from each case. In bad cases, the teeth and gums were cleaned with a cotton swab dipped in 50 per cent. alcohol, then with the flat end of a sterile toothpick material was scraped from the margin of the gums, and smeared over a clean glass slide. The preparation was fixed wet with methyl alcohol and sent to the laboratory. This was called the superficial smear. A second smear was made from material obtained from beneath the margin of the gums, and similarly fixed. This was called the deep smear. All the preparations were stained with Giemsa's solution. The amoebae were often found to contain masses of undigested material, such as leucocytes, red blood corpuscles and bacteria.

Thirty per cent. of the children showing healthy gums were found to be infected with amoebae. Fifty per cent. of those with healthy gums but decayed teeth showed amoebae. Eighty-four per cent. of those with tartar and receding gums contained amoebae, and 94 per cent. of those with spongy and bleeding gums. The authors point out that most of the cases of spongy and bleeding gums show more amoebae in the smears than the other cases. It is proposed to test the effects of ipecacuanha and emetine in the form of tooth washes.

In a discussion that followed the reading of this paper, it was doubted whether pyorrhoea alveolaris was directly due to Endamoebae. Spirochaetes were found in most of the mouths examined.

ii. After discussing the various hypotheses in regard to the action of amoebae in the human mouth, the authors give a further account of their own researches. Out of 1,678 school children examined between the ages of 5 and 15 years, 995 representative cases were taken, and stained smears from their mouths were made and examined for amoebae. The parasitic organisms seemed to be most numerous between the superficial bacterial layer and the deep leucocytic layer.

There appeared to be

"at least two morphologic types of amebas present: one small, with more or less rounded, dense nucleus, with a few or no inclusions or vacuoles, found in the majority of healthy mouths, and the other large, with more irregular nucleus with many large vacuoles and containing many red blood cells, leukocytes and other dense masses formed by undigested material. The latter type is found in the majority of unhealthy mouths. Its appearance agrees with that of the type most frequently seen in the well-developed cases of pyorrhoea alveolaris. We have seen no cysts. We have seen evidence of budding and of more equal division."

Infection begins at an early age, 35 per cent. of children between 5 and 7 years of age being infected. The numbers of those infected increase in frequency with age. Between 5 and 15 years, 60 per cent. are infected. In apparently normal mouths only 29 per cent. show amoebae. The numbers and percentages of amoebae found in groups of children are shown in the following table:—

NUMBER AND PERCENTAGE OF AMEBAS FOUND IN EACH GROUP OF CHILDREN.

Condition of Mouth.	Between 5 and 16 years.		Between 5 and 7 years.	
	Total.	Amebas present.	Total	Amebas present.
1. Healthy gums ..	(+ 38) (— 92)	= 29 per cent.	(+ 3) (— 31)	= 9 per cent.
2. Healthy gums, decayed teeth ..	(+ 109) (— 183)	= 37 per cent.	(+ 32) (— 105)	= 23 per cent.
3. Tartar and receding gums .. ..	(+ 182) (— 96)	= 65 per cent.	(+ 19) (— 17)	= 53 per cent.
4. Spongy, bleeding gums .. ..	(+ 268) (— 28)	= 91 per cent.	(+ 34) (— 5)	= 70 per cent.

The authors have divided the cases showing amoebae into three groups, "one to be watched without treatment, and others to be treated in different ways, one with emetin and the other by ordinary cleanliness." The results obtained are stated thus:—"With ordinary teeth cleansing methods, the number of mouths showing amebas is reduced one half. With emetin in the tooth wash, the number showing amebas is greatly reduced, only about 10 per cent. showing them. The second set of controls—those doing their cleaning *at home* by ordinary methods—continue to show amebas in about 75 per cent. of the cases." The strength of emetin solution has not yet been settled, 1 in 200 and 1 in 400 having been tried.

It is stated that:—"Amebas are demonstrated irregularly in all mouths once showing them, most constantly and in largest numbers in mouths showing gingivitis, least so in healthy mouths."

In the subsequent discussion Dr. C. C. Bass stated that the oral endamoebae fed on certain nucleated cells that were to be found only in inflamed tissues. The endamoebae were observed burrowing in the inflamed tissue.

H. B. F.

LYNCH (Kenneth M.). **Concerning Endamebiasis of the Mouth.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1915. Oct. Vol. 3. No. 4. pp. 231-242.

The author reviews the work of previous observers on oral endamebiasis (Riggs' disease) due to *Endamoeba gingivalis*. Simple smears from the gum edges were made and stained with Wright's or Leishman's stains. The alveolodental periosteum and the mucous membrane of the gums are infected by the Endamoebae, and injury to the dental membrane is a factor, but the author considers uncleanliness more important. Endamebiasis of the mouth is divided into:—

1. Amoebae present, with no resulting disease. Such occurred in the case of two toothless old women.

2. Microscopic pyorrhoea alveolaris, wherein small amounts of white granular material occur beneath the margins, in the obtaining of which the tissues bleed more easily than normal. In this material amoebae are found. Inject  $\frac{1}{2}$  grain of emetine hydrochloride daily till no more amoebae are found.

3. Early chronic pyorrhoea, recognisable grossly, with gradual destruction of the peridental membranes and a chronic catarrh of the gum margins. Five to eight days' treatment with emetine hypodermically should suffice.

4. Late pyorrhoea alveolaris, wherein pus pockets and sinuses are produced. Local injection of the sinuses with  $\frac{1}{2}$  per cent. solution of emetine hydrochloride as well as hypodermic administration is carried out. The amoebae encyst in undrained cavities. Surgical procedure may be necessary.

5. Chronic pyorrhoea with general acute catarrhal stomatitis. In one case, amoebae were found in material from the tongue and other surfaces.

6. Chronic pyorrhoea with complicating infections. *Trichomonas* may be present, and has to be eliminated by alkaline washes before the endamoebae will respond to emetine.

7. Acute pyorrhoea alveolaris—with general involvement of the gum margins.

8. Endamoebae in aphthous and ulcerative stomatitis—a case with history of ulceration of the mouth for 15 years.

9. Amoebae in glossitis—six cases with sore tongues; amoebae were obtained from the open surfaces.

Prevention—that is, care of the mouth and teeth—is important, and early recognition and treatment of the disease with emetine. The author does not favour the use of ipecac mouth washes. The necessity for coöperation with an oral surgeon must be recognised.

H. B. F.

CRAIG (Charles F.). **Observations upon the Endamebae of the Mouth.**

I. *Endamoeba gingivalis* (buccalis).—*Jl. Infect. Dis.* 1916. Feb. Vol. 18. No. 2. pp 220-238. With 1 plate.

This paper is both interesting and critical. The author believes that *Endamoeba gingivalis* Gros is identical with *Endamoeba buccalis* Prowazek. He has found a new parasite in the human mouth which he calls *Endamoeba confusa*, characterised by its small size, details of



which will be published later. It is considered probable that each of these organisms together with *E. histolytica*, *E. coli*, and *Vahlkampfi* sp. may occur in the human mouth. An historical survey of earlier work on oral amoebae is given, in which it is noted that CHIAVARO (1914) was the first to describe encysted forms of *E. gingivalis*. The parasite is stated to have a world wide distribution. A detailed account is given of its morphology. Trophic, pre-cystic and cystic stages are described. Multiplication occurs by simple division during the first stage and is absent during the second. No development is said to occur in the cysts, as only uninucleate forms have been seen, and these are considered to be resistance cysts. Trophic forms vary in size from  $7\mu$  to  $35\mu$  in diameter. The pseudopodia vary much in shape and, in the living condition, the nucleus is usually invisible. The organism is actively phagocytic. The author has observed a process which he regards as conjugation, two endamoebae becoming united and interchanging cytoplasmic material, after which separation occurs. Budding or gemmation has been seen, which process is considered to be degenerative. The precystic forms are reduced in size, the average diameter being about  $10\mu$  to  $12\mu$ , the nucleus more marked and the organism almost non-motile. The cysts usually measure from  $8\mu$  to  $10\mu$  in diameter. The pre-cystic and cystic forms of *E. gingivalis* are rare. In stained specimens the nucleus of *E. gingivalis* is stated to be smaller than that of *E. histolytica* in the histolytica phase, and to possess a thicker nuclear membrane and a larger karyosome. The frequent occurrence of oval or round bodies within the trophozoite is very characteristic, and is of some diagnostic value in this species. Neither rectal injection nor feeding of material containing *E. gingivalis* gives rise to diarrhoea or dysentery in animals.

The author states that "it is more than doubtful that *Endamoeba gingivalis* is the cause of pyorrhoea alveolaris, and that it is yet too early to make positive statements regarding the relationship of this parasite to disease." Regarding the treatment with emetine of patients suffering from this disease, he found that "while the endamebae generally decrease in number during its administration, careful search will show motile and apparently healthy endamebae in the lesions throughout the period of administration." The author has found that "spirochaetes are present in immense number" in all cases of pyorrhoea alveolaris and emetine appears to have some action on them, as they certainly lessen in number under treatment. It is noted that cases of severe typical pyorrhoea are known in which endamoebae could not be demonstrated.

The various stages of *E. gingivalis* are illustrated in a plate of 12 figures.

H. B. F.

JOHNS (Foster M.), *A Study of Endameba buccalis in Alveolodental Pyorrhoea*.—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1916. Jan. Vol. 3. No. 7. pp. 372-376.

Alveolodental pyorrhoea begins "with some trauma, or food-pressure necrosis, divesting the peridental membrane of its covering mucosa, [and] it very slowly extends by an ulcerative process down, or around, the root of the tooth. Peridental membrane consists essentially of connective tissue fibres running from the alveolar wall to the

cementum of the tooth root." Sloughing ensues and a pocket is produced around the base of the tooth. Careful scrapings from the bottom of a pocket show pus cells, red cells, tissue cells and connective tissue fibres, accompanied by *Endamoeba buccalis* and a number of bacteria. The Endamoebae rarely occur in the pus from pyorrhoea pockets, but the pus may contain spirochaetes.

The Endamoebae transport masses of adherent bacteria. The protozoal parasites feed principally on large nucleated cells. They multiply by binary fission and were not observed to undergo either schizogony or encystment. Sections of lesions "show endamebae in large numbers bordering upon, and occasionally penetrating, the area of chronic inflammation just beneath the surface of acute supuration." It is possible that the Endamoebae alone are not entirely responsible for the production of the lesions. "Probably the opening of avenues of infection, or the direct transportation and constant replanting of adherent bacteria into and about the granulation tissue elements, constitute a very important factor in the production of the lesion."

Regarding the action of emetine hydrochloride, the author concludes that "it is possible that the harmful action of emetine towards parasitic endamebae is achieved indirectly by altering one of the necessary factors to the continued growth of the endamebae in the lesion."

H. B. F.

LYNCH (Kenneth M.). **An Ameba in Suppurative and Hyperplastic Osteoperiostitis of Inferior Maxilla.**—*Jl. Amer. Med. Assoc.* 1915. Dec. 11. Vol. 65. No. 24. p. 2077.

The author has found amoeboid cells in the pus from the left half of a diseased mandible taken from a negro woman in the Roper Hospital, Charleston, South Carolina. The case was diagnosed as osteosarcoma.

"The bone was thick, with rough surface into which ran small clean-cut sinuses containing thick white granular pus." There was a prominent portion about the middle of the bone, over which was a hard fibrous mass like a tumour. The first molar tooth was missing, and the third was represented by a decayed root. Microscopically the tumourous mass appeared to be that of an "inflammatory growth of bone and connective tissue of a progressive nature, showing areas of necrosis and pus formation corresponding to the previously mentioned sinuses."

No bacteria were found in the pus, which contained granular materials, neutrophile leucocytes, eosinophiles, some recognisable tissue cells, and numerous amoeboid cells. These latter when rounded were  $40\mu$  in diameter, had clear ectoplasm and coarsely granular endoplasm. No nucleus was recognisable either in the fresh state or when fixed and stained. Large, broad, single pseudopodia were formed, which engulfed red blood corpuscles and leucocytes. Unfortunately, the specimens were destroyed before complete examination had been made.

The author considers the amoeboid bodies to be parasitic amoebae. different from any previously described. He does not know whether these amoeboid cells were the etiologic factor of the tumour or not, but suggests that they may have been.

[From the description given, the protozoal nature of the amoeboid bodies observed is not yet proven.]

H. B. F.

**HOXIE (George Howard). Pyorrhoea due to Organisms other than the Amebas.**—*Jl. Amer. Med. Assoc.* 1915. Nov. 27. Vol. 65. No. 22. pp. 1908-1909.

The author considers that Endamoebae are not the cause of all the cases diagnosed as pyorrhoea alveolaris. A case is described. There was a recurrent fever of about 17 days' duration, as well as knee pains. Cultures from necrotic plugs showed species of *Aspergillus*, while smears showed diplococci. Vaccines were administered.

H. B. F.

**EVANS (J. S.), MIDDLETON (Wm. S.) & SMITH (Allen J.). Tonsillar Endamebiasis and Thyroid Disturbances.**—*Amer. Jl. Med. Sci.* 1916. Feb. Vol. 151. No. 2. No. 527. pp. 210-222.

This interesting paper begins with a survey of the various forms of goitre and their possible causative agents and excitants. Among others, the works of McCARRISON, FARRANT and CHAGAS are referred to. The present investigation began with a statistical study of endemic goitre in Wisconsin, especially among university students. Wisconsin is situated in a goitre belt in a glacier zone. From 34 goitre subjects with chronic cryptic tonsillitis the following organisms and structures were found in material aspirated from the pouting crypts :—*Endamoeba gingivalis*, myriads of bacteria, spirilla, numerous granular leucocytes (pus cells), erythrocytes and a few epithelial cells. The authors think "that the essential toxic factors are really the products of the bacteria associated with the amebae, and that these bacteria are the variants and the amebae are the constants in many varying infections of the mouth, tonsils, and the nasal passages and sinuses, that there is a symbiotic relation between the protozoa and the bacteria, the amebae by proteolysis of various cells producing a pabulum of special value for the nutrition and growth of the bacteria, and the bacteria being constantly ingested and digested by the amebae, that as one particular form of bacteria is prominently present its toxin is liberated in prominent amount when the bacterial cells are thus digested, and that if that toxin has selective stimulative effect upon the thyroid elements, thyroid hyperplasia will follow."

The results of treatment with emetine hydrochloride are thus commented upon :—

"The reduction noted in the goitre mass, as well as the amelioration of the dysthyroidic symptoms, is the result of the removal by emetin of the amebae demonstrated in the tonsillar crypts in these cases, this resulting in a breaking of an important symbiotic chain of endamebae and thyrotoxic bacteria, and removing thereby from these foci the active elaboration of the directly influential toxins."

This represents the authors' belief, but absolute proof is lacking.

The conclusions are as follows :—

"1. Tonsillar lesions of an infective cryptic character were found in 22.8 per cent.; and nasal together with tonsillar lesions existed in 90 per cent. of 362 goitrous individuals examined from this standpoint.

"2. In typically diseased tonsils, out of 34 cases examined microscopically, 97 per cent. were found to harbour *Endameba gingivalis* (Gros) in the tonsillar crypts.

"3. Of 16 individuals of this group who after treatment by means of emetin hydrochloride were re-examined, 13, or 81 per cent. were shown to no longer have endamebae in the cryptal contents.

"4. In 23 individuals to whom emetin was administered a reduction in the bulk of the goitre was appreciable in 18 individuals, and of 7 dysthyroid cases included in this group of treated cases 6 were benefitted in degrees varying from slight amelioration to apparent cure.

"5. Inability to demonstrate endamebae in the thyroid gland renders improbable any direct causal relation of the amebic infestation of the tonsils *per se* upon the development of thyroid disturbances.

"6. However, the improvement, morphologically and symptomatically, in the treated cases leaves little doubt, after ruling out a vasomotor influence from the emetin employed, as to an indirect relationship. A symbiosis of endamebae with appropriate bacteria leading to the elaboration and absorption into the thyroid of selective thyrotoxic poisons, is at least conceivable in explanation of such relation.

"7. In no sense do the writers care to be understood as advancing hereby an exclusive explanation for all goitres; other types and other locations of infections capable of producing thyrotoxic toxins, perhaps, too, toxic substances having a similar influence but derived from metabolic or alimentary fault, or even entering the body from without, are all of possible influence; nor is the influence of sympathetic stimulation, however accomplished, to be overlooked. The writers are unable to follow, moreover, in any of these lines of thought, into any satisfactory explanation of the known occurrence of belts of endemic goitre along certain well-defined glacier drifts."

H. B. F.

#### BACILLARY DYSENTERY.

KRUSE (W.). *Die Ruhr in Krieg und Frieden*. [Dysentery in War and Peace.]—*Deut. Med. Woch.* 1915. Sept. 2. Vol. 41. No. 36. pp. 1057-1059.

Although this is a paper of a general nature devoid of clinical data, the views expressed must claim attention since the author's name has been linked with that of SHIGA as the co-discoverer of the type of dysentery bacillus bearing their joint names.

After a short historical introduction he goes on to say that the dysentery in the German army to-day is entirely bacillary, and the cases are mild. Bacilli are classed as true dysentery (Shiga-Kruse), and pseudo-dysentery including all the other types. Pseudo-dysentery is the milder variety and is characterised by absence of tenesmus, and blood in the motions. It is less dangerous, and is the type endemic in asylums. It is met with also in children and termed "enteritis follicularis." It is the preponderating variety of dysentery in this war, a quarter only of the cases being true dysentery. The death rate is only a fraction per cent. even in military hospitals, whereas that of true dysentery in times of peace reaches about 3 per cent. taking the same age classes. Kruse divides pseudo-dysentery bacilli into types A, B, C, etc., and considers the grouping as Flexner and Y types, according as maltose is or is not fermented, as wholly artificial and not conforming to any natural classes. The power to ferment this sugar is unstable and by using it as a criterion we class together varieties which are really distinct, and separate others which are closely allied.

With regard to the diagnosis of the two kinds of dysentery, a rule which is usually valid is that if the patient's serum agglutinates the

Shiga-Kruse bacillus in at least a 1 : 50 dilution, the case is one of true dysentery ; if there is no agglutination with this bacillus we have to deal with pseudo-dysentery. The value of agglutination in the case of pseudo-dysentery is discounted by the fact that the bacilli are often agglutinated by normal blood, to say nothing of the blood of true dysentery and typhoid cases.

Immunisation against true dysentery up to the present has not been very successful. Active immunisation with dead bacilli leads to very marked local and general disturbances. The author has experimented upon himself without much success. On the other hand passive immunisation is quite practicable, as a potent immune serum can be prepared. It is however not much use in war-time since the protection conveyed is but short-lived while the exposure to infection is practically constant.

E. E. A.

MATTHES (M.). **Zur Klinik der Bazillenruhr.** [Outbreak of Bacillary Dysentery.]—*München. Med. Woch.* 1915. Nov. 9. Vol. 62. No. 45. pp. 1545-1548.

An outbreak of diarrhoea occurred in one of the German armies. The cause was at first obscure. The cases were mild and the question of cold or inappropriate food suggested themselves as exciting factors. No pathogenic bacteria were isolated from the stools. Later on the cases were more severe and the disease spread to the personnel of the hospital. It was now evident the outbreak was of an infectious nature. After it had lasted three weeks the examination of perfectly fresh faeces from some of the cases disclosed the presence of *B. dysenteriae* Y ; moreover on testing the serum of convalescents this same bacillus was agglutinated. The reason it was not found before may perhaps be explained by the fact that the original samples of faeces could not be examined for one or two days after they were passed.

Relapses were frequent and often worse than the initial attack. In addition to the diarrhoea the clinical features of the disease worth noting were, absence of swelling of the spleen, slow pulse, slight leucocytosis (10,000 to 15,000) during the febrile attacks, and a positive diazo reaction. A relatively frequent complication was bronchitis and, in the bad cases, broncho-pneumonia.

The most important part of the treatment consisted in washing out the large gut. The patient was put in the knee-elbow position and a half per cent. solution of tannin injected until discomfort began to be felt. After evacuation this was repeated until 4-5 litres had been used. A miscellaneous assortment of drugs and applications was also employed, not requiring special mention. The fatality was at most a half per cent. There were practically no sequelae. Although these cases were all due to the same cause the character of the motions was markedly different in the individual cases. Some were foul smelling with evidence of much fermentation ; others contained blood and mucus.

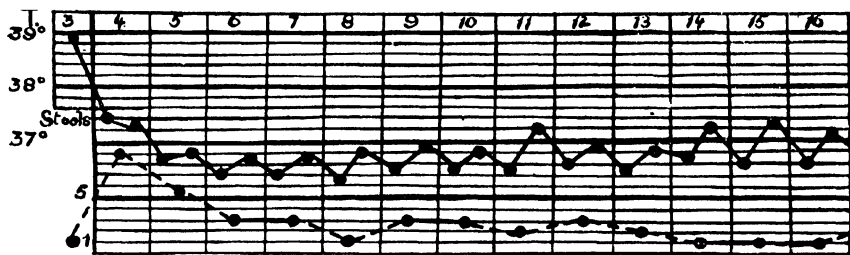
In a footnote the author remarks that the cases he saw subsequently in the autumn were considerably more severe than those described above, which were observed in the spring. The bacteriologists found for the most part Flexner and Shiga-Kruse bacilli. Good results

followed the intravenous or intramuscular injection of dysentery serum. Treatment with adrenalin was useless, but a new astringent compound of calcium and tannin was more efficient. [One is left in doubt as to the true relation of these last mentioned cases to those of the epidemic described in detail, and whether *B. dysenteriae* Shiga was not responsible for some of them also. It would also have been interesting to know what kind of dysentery serum was used and above all the agglutination reactions of the blood of these later cases.]

E. E. A.

KITSTEINER (C.). *Erfahrungen über leichte Ruhrfälle*. [Experiences with Cases of Mild Dysentery.]—*München. Med. Woch.* 1915. Dec. 21. Vol. 62. No. 51. pp. 1766–1768. With 4 charts.

These remarks are based on 70 cases of clinically typical dysentery of the mild variety. Bacilli of the Flexner type were isolated from several of the cases. The author has observed a characteristic temperature curve for all these cases. The chart reproduced below is the average of six separate temperatures.



Curves of Temperature and Stools.  
Average of six Cases.

It will be noticed that after a rapid fall on about the third day of the illness the temperature remains normal or sub-normal until the 11th day when a slight rise occurs. There is another fall on the 12th day followed by a small increase on the evening of the 14th day. The subnormal morning temperatures are also a striking feature. A relation between the number of stools and the temperature does not exist except at the very beginning.

A characteristic of the stools is that they display marked fermentation, which indicates that carbohydrate digestion is interfered with. The small intestine is therefore involved as well as the large. By giving a carbohydrate-free diet the fermentation ceases and fluctuations of temperature are minimised. These symptoms are not fully developed before the second week.

With regard to treatment Bolus gave the best results. It is useless giving small doses—an effective dose is 100–300 grams. If the faeces become hard, the amount of bolus must be diminished. It is however useless in severe cases. Opium in large doses is a useful adjunct. Tannin rectal injections gave good results in obstinate cases, but those containing ichthyol were of no use. Atropin counteracted constipation when present. For the painful colic, adrenalin was given and acted usually in half an hour.

E. E. A.

**JOB (E.). Dysenterie bacillaire et infections à paratyphus B.**—*Bull. et Mém. Soc. Méd. des Hôpit. de Paris*. 1915. Nov. 4. 3 ser. Vol. 31. No. 31-32. pp. 870-873. With 4 charts.

Four cases of bacillary dysentery are described, in the course of which *B. paratyphosus* B was isolated from the blood. In the first two the damage caused by the dysentery bacillus to the intestinal mucosa appears to have afforded an easy entry for the paratyphoid bacillus, which had hitherto been leading a saprophytic existence in the intestine. The patients were in hospital suffering from dysentery and were getting better, when suddenly a rise of temperature occurred, coincident doubtless with the invasion of paratyphoid bacilli.

The third case seems to have been a pure association of the two diseases. The dysenteric condition was improved by antidysentery serum.

The dysenteric factor of the last case seems to have been due to a bacillus other than the Shiga or Flexner types as the patient's serum agglutinated neither of these.

E. E. A.

**PENFOLD (W. J.). Two Cases of Dysentery in Children due to *B. dysenteriae* of Flexner Type.**—*Brit. Med. J.* 1915. Nov. 13. p. 722.

The onset in the first case was with a high temperature (103·8°) and delirium. The patient, three and a half years old, was seized with vomiting, and passed green, watery motions at first which soon became slimy and contained a quantity of blood. On the second day the motions numbered over a dozen but the temperature was normal. Blood disappeared from the stools on the 4th day. By the 6th day the stools were normal again.

The second case was the infant sister of the first. There was neither fever nor delirium. Blood and mucus appeared in the motions but the disease was very much milder in this instance.

In both cases a bacillus which proved to be *B. dysenteriae* Flexner was isolated. They gave the usual fermentation reactions and were agglutinated to the full titer of a specific serum (1 : 2560). The serum of the first child agglutinated her own strain of bacillus in a dilution of 1 : 80 on the 4th day.

E. E. A.

**RENCUREL (J. E.). De la fréquence du pouls comme élément de diagnostic de dysenterie bacillaire.**—*Bull. Soc. Méd.-Chirurg. Indochine*. 1915. Mar. Vol. 6. No. 3. pp. 77-88. With 7 charts.

Anti-dysentery serum (Dopter) is only of use when given quite early in the disease. Impressed with this fact, Rencurel sought for some symptoms which would enable him to make a rapid differential diagnosis between bacillary and amoebic dysentery. This he found in the frequency of the pulse which is much higher in the bacillary type of disease.

[As no bacteriological nor microscopic examinations were made to clinch his diagnoses, he cannot be said to have proved his point with certainty.]

E. E. A.

**RAUCH (Janina).** Ueber periostale Späterkrankungen nach Ruhr. [Late Periosteal Lesions after Dysentery.]—*Med. Klinik.* 1915. June 13. Vol. 11. No. 24. pp. 672–673. With 2 text-figs.

The author records a set of four cases of periostitis in patients who had had dysentery. In one of them *B. dysenteriae* Shiga was still present and the serum gave an agglutination (1:300). The condition closely resembled a post-typhoid periostitis. The front of the tibia was the site of election and in one case the fibula was also involved. The periosteum was felt to be thickened on palpation, and the lesion could be detected by skiagram. There was pain on pressure and when walking, but it was usually absent when the patient was in bed. A typhoidal origin was of course excluded in these cases.

E. E. A.

**SCHLESINGER (Hermann).** Dysenterische Polyneuritis bei Kriegsteilnehmern. [Dysenteric Polyneuritis in Soldiers.]—*Med. Klinik.* 1915. Apr. 4. Vol. 11. No. 14. pp. 383–385.

A careful examination of what appeared to be rheumatic pains in soldiers, showed that they were in reality polyneuritis. Enquiry elicited the fact that they had previously suffered from frequent stools with blood and tenesmus, suggesting dysentery. The author also saw neuritis in some dysentery cases under his observation. The myalgia frequently observed after dysentery is probably neuritis. It is questionable whether it is commoner after the Flexner or Shiga type of dysentery, since the bacilli could not be isolated from the motions.

*Symptoms.*—Pains in legs. Feeling of deadness in fingers and toes. Increased sensitiveness to heat and cold in hands and feet. The nerve trunks of the arms and legs are sensitive to pressure. The muscles of the calf and thigh are painful when pinched. Anaesthesia is observed most often in the legs. Motor nerve disturbances were almost non-existent. All that was noticed was slight paresis of legs and arms, obliging the patients to use a stick when walking. The electrical reactions, in those cases which were tested, were normal. The knee-jerks disappeared in some instances but always returned in a few weeks. The whole course of the disease lasted only a few weeks.

*Therapy.*—This consisted of a rest cure with warm baths and salicylates.

[It is to be regretted that agglutinations were not done in these cases. If experiments on rabbits are any guide, these cases were probably caused by *B. dysenteriae* Shiga as this type produces severe paralysis in these animals in anything but the smallest doses, whereas the Flexner type does not produce lesions of the nervous system.]

E. E. A.

**OPPENHEIM (R.).** L'insuffisance surrénale dans la dysenterie bacillaire et les entérites graves.—*Bull. et Mém. Soc. Méd. des Hôpît. de Paris.* 1915. Dec. 16. 3 ser. 31 Ann. Nos. 37–38. pp. 1155–1168.

Two cases are first described. The first had abnormal dysenteric stools—that is to say, neither blood nor mucus was present. There was marked arterial hypotension, indicating suprarenal gland insufficiency. Although the case was not seen until late adrenalin



was given, but death ensued. At the autopsy dysenteric ulceration was found, and haemorrhagic foci, some of them large, were present in both suprarenal glands. The second case resembled the first, but had blood and mucus in the stools. The same lesions were found post-mortem.

The number of cases of diarrhoea treated in the hospital was 657, of which 96 showed the dysenteric syndrome. On account of lack of the means for carrying out bacteriological examinations it is impossible to say how many of these were true dysentery. It is now known that dysentery bacilli do not always give rise to blood and mucus in the stools and inversely that stools containing the latter are not necessarily associated with dysentery. There were no deaths at all among these cases of enteritis with the exception of the two noted above, which were only seen by the author quite late in the course of the disease. These good results are ascribed to the early use of anti-dysentery serum and in large part also to the administration of adrenalin. In all the severe cases there was evidence of suprarenal insufficiency, four grades of which can be distinguished.

(1). *Super-acute*, to which the two cases referred to above belong.

(2). *Acute*. Irrespective of the intensity of the intestinal symptoms the patient exhibits a state of depression and extreme prostration from the first. He is generally emaciated and shows in a more or less marked degree the peritoneal facies. Speaking or moving appears to cost him a great effort. Vomiting is often observed. There is abdominal tenderness not only in the region of the colon, but also in the epigastrium and the whole area supplied by the solar plexus. The abdominal pains are accompanied by pains in the lumbar region analogous to those observed in Addison's disease. The pulse is rapid and small with a very low tension. Some of these symptoms, namely, arterial hypotension, acceleration of the pulse, collapse and often subnormal temperature suggest myocarditis, and the differential diagnosis may be difficult but the abdominal pains, the depression and pallor should make the diagnosis clear. The administration of adrenalin will also help to settle the matter since, although it exerts a tonic effect on the myocardium in all cases where the latter is affected, yet we never see such marvellous results as when the heart affection is secondary to disease of the suprarenal glands.

(3). *Subacute* in which the suprarenal symptoms do not dominate the condition as in (1) and (2), but allow the intestinal symptoms to become the most prominent feature. The suprarenal syndrome is present nevertheless and the patient is benefitted greatly by adrenalin.

(4). *Mild*. In a still milder form of the disease two signs of suprarenal trouble alone remain—prostration and arterial hypotension.

E. E. A.

PARHON (C. J.). L'Adrénaline dans le traitement de la dysenterie. A propos de la communication de MM. Remlinger et Dumas.\*—*C. R. Soc. Biol.* 1915. Nov. 5. Vol. 78.. No. 16. pp. 527-529.

The author cites 12 cases of dysentery which underwent no specific treatment as no anti-dysentery serum was available. They are

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\*See this *Bulletin*, Vol. 6, p. 460.

divided into two groups of six. The first six all died. The most striking symptoms were collapse and low arterial tension, which suggested the use of adrenalin. This drug was tried in the second group. Unfortunately in two of the cases it was not given until late in the course of the infection, with the result that they both succumbed. The other four cases however were treated from the very beginning, and all recovered. [There is no mention upon what the diagnosis of dysentery depended in these cases. If true dysentery, they were presumably caused by *B. dysenteriae* Shiga in view of the high fatality.]

E. E. A.

ROGERS (Leonard). **Sensitized Shiga and Flexner Vaccines in the Treatment of Chronic Bacillary Dysentery.**—*Brit. Med. Jl.* 1916. Jan. 1. pp. 7-8.

After citing some failures from using ordinary Shiga vaccines in Calcutta, in which the patients' conditions were apparently aggravated, the author was led to try sensitized dysentery vaccines. Shiga and Flexner bacilli were sensitized with the Lister Institute's anti-dysentery serum [amount and technique unfortunately not stated], and administered in doses up to 100 millions. Two cases are reported to have received only temporary benefit. A case in which Flexner bacilli were found in the stools was treated with both Flexner and Shiga vaccines, receiving two doses of 50 and one dose of 100 millions at weekly intervals, because Rogers has seen greater benefit follow the injection of a Shiga vaccine in cases with Flexner bacilli in the faeces, than when a Flexner vaccine was used. This case was greatly improved but relapsed. Other instances of good results following the use of sensitised vaccines are given, including that of an Indian whose life, the author is convinced, was saved by a Shiga vaccine. It is quite likely the dose of vaccine could be increased beyond 100 millions with better results. It is pointed out that the cases dealt with here were intractable ones in which other methods of treatment had failed.

E. E. A.

STOERK (Erich). **Neuere Erfahrungen in der Behandlung der Ruhr und ähnlicher Dickdarmkatarrhe.** [New Experiences in the Treatment of Dysentery and Similar Affections.]—*Therap. Monatshefte.* 1915. Sept. Vol. 29. No. 9. pp. 505-511.

The author considers anti-Shiga dysentery serum good if used early in the disease. Anti-Flexner serum has not given good results. In a course of treatment, in addition to the administration of serum, the first thing to do is to clear the bowel of mucus as much as possible, by giving calomel. This should be followed by substances calculated to absorb the toxins in the intestine such as bolus alba (alumina), animal charcoal, etc. They must be given very liberally or else they will have no marked effect. Given alone, not less than 300 grams of bolus alba per diem should be administered. A convenient vehicle is hot tea. Stoerk has had very good results by combining two or three absorbing agents. Another drug which has given excellent results by the mouth is papaverin.

E. E. A.

**BUJWID (Odo).** *Ueber Dysenterieserum und dessen Anwendung zu prophylaktischen und therapeutischen Zwecken* [Prophylactic and Therapeutic Use of Dysentery Serum.]—*Med. Klinik.* 1915. Sept. 12. Vol. 11. No. 37. pp. 1027–1029.

At the outbreak of the war a dysentery epidemic was in progress in Cracow, chiefly Shiga in type. Anti-dysentery serum was tried on the cases. As a result of the experience gained it is claimed that this serum is as efficient as diphtheria antitoxin if it is given quite early in the disease.

The antiserum made in Cracow is obtained by giving horses living intravenous injections. Separate animals are treated with Shiga, Flexner, and some other strains of dysentery bacilli. Agglutinins are tested for, as it is assumed they run parallel with the other antibodies. The serum should have a titer of at least 1 : 3000 before it is used. Gradually increasing doses of living bacilli are introduced into the jugular vein with a few days interval until a considerable quantity— $1\frac{1}{2}$  to 2 agar plate cultures—can be easily tolerated, which usually takes two to three months. Many horses are very sensitive and should be discarded.

The agglutination titer of normal horse blood for Shiga is 1 : 120 to 1 : 200 ; for Flexner 1 : 200 to 1 : 400.

E. E. A.

**HEVER (Karl) & LUCKSCH (Franz).** *Ueber Ruhrschutzimpfung.* [Immunisation against Dysentery.]—*Wien. Klin. Woch.* 1915. Oct. 21. Vol. 28. No. 42. pp. 1134–1135.

An epidemic of dysentery took place in a district on the borders of Galicia containing 5,000 civilians. The majority of the cases occurred in the hilly part of this district where the inhabitants numbered 800. There were 67 cases in all, with 13 deaths. Several micro-organisms were obtained from the faeces of the patients. The first was identical with Shiga culturally but agglutinated equally well in a Shiga serum and in a Flexner serum, at a 1 : 4,000 dilution. Another bacillus was agglutinated only by Flexner serum and culturally agreed with this organism. Other strains were isolated.

The patients were transferred to the hospital of the neighbouring town. A polyvalent vaccine was prepared and all the remaining population from 14 years of age upwards were inoculated—243 persons twice and 100 persons once. In order to take no risks all children from four years upwards living in the houses affected were injected with a polyvalent immune serum. From the date of these inoculations only four fresh cases occurred. The first, a mild case became ill a day after the first injection. Another case which was moderately severe fell ill six days after the first injection. The fourth case was an uninoculated adult who visited the town and this was a rather serious one. Since then (about one month ago) no fresh cases have been reported although they have occurred in neighbouring places. [The fact that an organism is agglutinated equally well by a Shiga and by a Flexner serum is inexplicable and points to an error of technique. The evidence that some protection has been produced by active immunisation in these cases is good. Information as to the strength of the vaccines would have been very welcome.]

E. E. A.

PRATT-JOHNSON (J.) & MILNE (A. J.). **Dysentery: A Preliminary Note on a Method of Combined Preventive Inoculation against Typhoid, the Para-Typhoids, and Bacillary Dysentery.**—*Med. Jl. of S. Africa.* 1915. Nov. Vol. 11. No. 4. pp. 66-67.

**Combined Preventive Inoculation against Typhoid and Paratyphoid Fever and Bacillary Dysentery.**—*Brit. Med. Jl.* 1916. Jan. 15. pp. 88-89.

Some 150 inoculations with sensitised mixed dysentery vaccine were performed. Equal amounts of Shiga, Flexner, Kruse, Hiss, and Russel strains were used and sensitised with polyvalent dysentery serum. By this means the local reaction is markedly reduced. The authors make no attempt to bring forward evidence to show that the patients were protected. One injection of the vaccine produced agglutinins for each bacillus, and this the authors seem to take as evidence of immunity, but the crucial test is whether the inoculated persons when exposed to infection will take the disease, which proof is here absent.

E. E. A.

KUENEN (W. A.). **De bacillaire dysenterie en haar optreden in Deli.** [Bacillary Dysentery and its Occurrence in Deli.]—*Geneesk. Tijdschr. v. Ned. Ind.* 1915. Vol. 55. No. 3. pp. 203-342. With 9 diagrams.

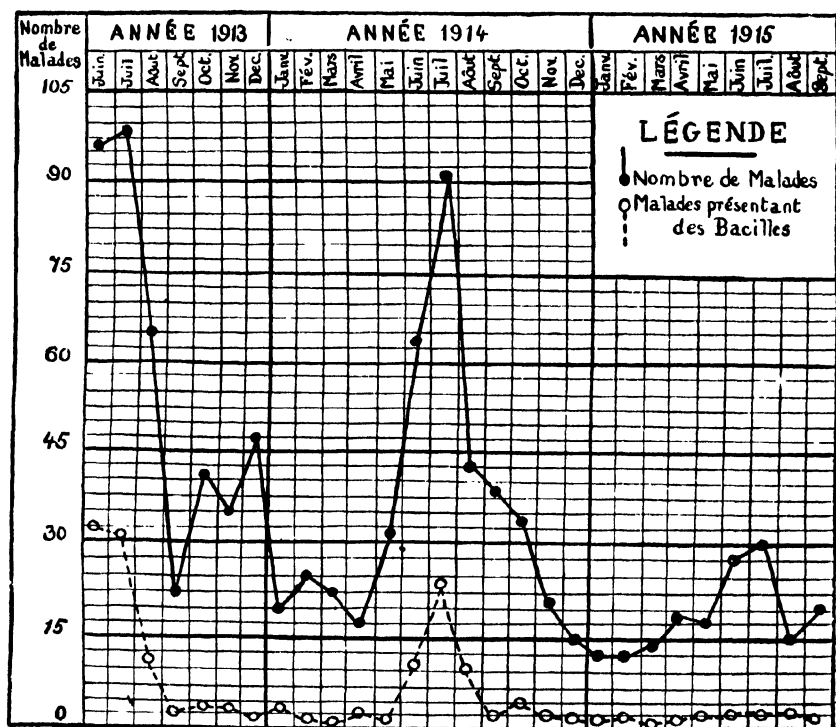
The greater part of this very long memoir is taken up with a discussion of the subject of bacillary dysentery in general, presumably for the benefit of Dutch practitioners in the East Indies, who have no access to the literature of the subject. As will be seen from the index at the beginning, only some 15 pages or so of the paper have reference to local conditions. The scene of the author's personal investigations appears to have been a large tobacco plantation in Sumatra known as the Deli-Mij, where several thousands of Chinese and Japanese coolies are employed, and, like many other workers in a similar sphere of activity, the author has come to the conclusion that it is absolutely necessary to maintain a regular quarantine for detecting all kinds of chronic intestinal diseases in the case of immigrant workers from China and Japan. Expensive though such an arrangement may be, it seems to be repaid by results, and in this connection the author reproduces a chart [fig. 1] from W. SCHUEFFNER's *Tropenhygiene und ihre probleme* [see this *Bulletin*, Vol. 3, p. 394] in which it is shown that on a neighbouring tobacco estate, the Senembah-Mij, the mortality among a large body of coolies was reduced, during the years between 1890 and 1911, to 11.5 per 1,000 per annum from 74 per 1,000 per annum, at which it had previously stood, mainly as the result of hygienic measures and diagnostic precautions. More recently, at the Deli-Mij, the author shows that, for the seven years comprised between 1907 and 1913, amoebic and bacillary dysentery conjointly were responsible for, roughly, 400 deaths (bacillary 165, amoebic 133) out of every 1,000, among Chinese, Javanese and Klingali coolies, so that much still remains to be done in this connection in the way of prophylaxis and the cure of these diseases. Bacillus-Y dysentery the author finds to be much more prevalent than the Flexner and Shiga-Kruse forms, and its fatality seems to be greater than is generally supposed.

The present memoir may be usefully read in connection with SCHUEFFNER's brochure above mentioned.

J. B. N.

DENIER (A.). *La dysenterie bacillaire à Saïgon.*—*Bull. Soc. Path. Exot.* 1915. Dec. 8. Vol. 8. No. 10. pp. 720-725. With 1 chart.

Dysentery at Saïgon in French Cochinchina is due to similar causes to that occurring elsewhere. From June 1913 to September 1915 the cases were bacteriologically examined. In 1912 severe dysentery raged at Saïgon, which was somewhat mitigated in the next year. During 1914 and 1915 a diminution in virulence took place. Perhaps this may be attributed chiefly to the use of emetine, but probably also to a decrease in the numbers of the standing army and replacement by reserves, who were only in barracks for a limited period. The cases as a rule were only examined once. All sorts of intestinal disorders producing diarrhoea were included amounting to 1,009 cases. Dysentery bacilli were found 175 times, associated in nearly half of the cases with amoebae, and exceptionally with other types of dysentery bacilli.



As the chart shows, the greatest number of cases of intestinal infection occurred each year in July and practically the same is true for the number of cases yielding dysentery bacilli. This is coincident with the beginning of the rainy season.

E. E. A.

NISBET (W. B.). **An Isolated Epidemic of Bacillary Dysentery.**—*Med. Jl. of Australia.* 1915. Oct. 2. Vol. 2. 2nd year. No. 14. p. 313.

Five cases of clinical dysentery occurred amongst nine people at a lighthouse in an isolated district on the coast of North Queensland. The origin of the infection is put down to fishermen visiting the neighbourhood, their excreta being supposed to be dried by wind and sun, and carried to the roofs and interiors of the houses where it infected the water and food. A bacteriological examination was made on only one of the cases. A bacillus was isolated from the faeces which morphologically and culturally belonged to the Flexner dysentery group, but showed only slight agglutination with Flexner serum (1:100) and none with Shiga serum.

E. E. A.

LOEWENSTEIN (Ernst). **Ueber das Vorkommen von Dysenteriebazillen in einer Pferdeschwemme.** [The Presence of Dysentery Bacilli in a Horse Pond.]—*Wien. Klin. Woch.* 1915. Sept. 16. Vol. 28. No. 37. pp. 998-999.

A number of cases of dysentery or typhoid fever occurred amongst both military and civil population at Zombor in Hungary. The one thing they all had in common was that they had bathed in the same swimming bath, which was situated on a canal about 10 yards below a horse pond. *B. dysenteriae* Flexner and *B. typhosus* were found in the latter but not in the swimming bath. Both were then closed and seven days later dysentery bacilli could not be found in the horse pond. No further cases of dysentery or typhoid fever occurred. The soldiers were known to enter the water with their horses and in this way no doubt they infected the horse pond. The infection would be easily transferred by the sluggish current of the canal to the swimming bath.

E. E. A.

PRIBRAM (Ernst). **Die Aufgaben des Bakteriologen bei der bazillären Dysenterie.** [The Function of the Bacteriologist with Respect to Bacillary Dysentery.]—*Med. Blätter.* 1915. Sept. 20. Vol. 37. No. 18. pp. 210-212.

The clinician wants a rapid diagnosis. From this point of view the bacteriologist has several difficulties to contend with. Pure cultivation is not so easy as in the case of typhoid and cholera. We are able to obtain the specific organism from the blood of cases of typhoid fever, while in cholera other organisms than the vibrio receive a set back in the intestine. Fermentation reactions are not absolutely stable, and may therefore lead to fallacious conclusions. Again group agglutination is commonly observed, so that other bacilli may be mistaken for the suspected one unless great care is taken. Shiga agglutinating serum from horses often agglutinates a Flexner strain to the titer limit. This difficulty may be overcome by preliminary absorption of the Flexner component, but the process is too laborious for clinical use. Another obstacle is the so called para-agglutination, by which is meant that organisms closely related to *B. coli* and even streptococci obtained from the patient's faeces are agglutinated by a dysentery serum.

Testing the patient's serum with a known dysentery bacillus is a useful help to diagnosis but can only be applied in a limited number of cases owing to the amount of labour involved. An important function of the bacteriologist is to tell the clinician whether cases of intestinal catarrh are dysentery or not, which is a point of considerable moment from an epidemiological standpoint. Streptococci and such bacteria as the El Tor vibrio may produce similar symptoms but they do not give rise to an epidemic.

E. E. A.

**SALUS (Gottlieb).** *Zur bakteriologischen Dysenteriediagnose.* [Bacteriological Diagnosis of Dysentery].—*Wien. Klin. Woch.* 1915. Oct. 14. Vol. 28. No. 41. pp. 1101-1103.

It is probable that there is an excessive diagnosis of dysentery. Many physicians are too prone to call any case dysentery passing mucus and blood or even blood alone. The excretion of bacilli is often intermittent, especially in cases with few ulcers, so that negative findings in dysentery are common. The moral is therefore, do not rely entirely on the bacteriological examination of the stools, but also test the serum for agglutination. The diagnosis of atypical bacilli as the cause of dysentery must be undertaken with caution.

E. E. A.

**EGYEDI (H.) & KULKA (Wilh.).** *Eine Fehlerquelle der bakteriologischen Dysenteriediagnostik.* [A Source of Error in the Bacteriological Diagnosis of Dysentery].—*Wien. Klin. Woch.* 1915. Sept. 23. Vol. 28. No. 38. pp. 1031-1034.

A paper of a purely bacteriological nature, the gist of which is that in the hurried diagnosis of dysentery at the front in war-time, one is liable to mistake other bacteria, closely resembling it as regards morphology and fermentation reactions, for *B. dysenteriae*. Agglutination of bacilli isolated from the faeces, unless well marked, is liable to be misleading.

E. E. A.

**SONNE (Carl).** *Die diagnostische Bedeutung der Agglutination der giftarmen Dysenteriebacillen (Paradysenteriebacillen) in Patientenseris.* [The Diagnostic Significance of Agglutination of the Atoxic Dysentery Bacilli by the Sera of Patients.].—*Centralbl. f. Bakt.* 1. Abt. Orig. 1915. May 14. Vol. 76. No. 1. pp. 65-87.

**Ueber die Bakteriologie der giftarmen Dysenteriebacillen (Paradysenteriebacillen).** [The Bacteriology of Atoxic Dysentery Bacilli (Paradysentery Bacilli).].—*Ibid.* Feb. 15. Vol. 75. No. 5/6. pp. 408-456.

In a preliminary investigation of 75 cases the author has shown that there are three main groups into which the atoxic dysentery bacilli (Flexner-Y type) may be divided. The first two probably contain all the bacilli hitherto described as dysentery bacilli. The third group he claims to have established for the first time.

It has been known for some time that sera from apparently normal people possess the power of agglutinating these bacilli. The following

experiment was put up to estimate its extent. 116 sera sent in for the Wassermann reaction were tested with a bacillus of Group I, and with one of Group II.

GROUP I.				Per cent. of cases.
Agglutination Titer.				
1 : 250 and higher	..	..	..	2·6
1 : 100    "      "	..	..	..	16·4
1 : 50     "      "	..	..	..	37·9
< 50	..	..	..	62·1

GROUP II.				
1 : 250 and higher	..	..	..	7·8
1 : 100    "      "	..	..	..	22·4
1 : 50     "      "	..	..	..	37·9
< 50	..	..	..	62·1

GROUPS I AND II.				
1 : 250 and higher	..	..	..	0·9
1 : 100    "      "	..	..	..	7·8
1 : 50     "      "	..	..	..	22·4
< 50	..	..	..	46·6

It is seen that a little over a third of these cases can be said to agglutinate ( $> 1:50$ ) one or other of this type of dysentery bacilli. It must be remembered that Shiga is not being dealt with in this paper.

In all of the positive cases, bacilli of the type *B. coli* were isolated from the faeces, which were agglutinated by the corresponding dysentery agglutinating serum. This phenomenon is known as para-agglutination. The opposite of this, namely whether bacteria which are agglutinated by dysentery serum can be found in the faeces of cases whose sera do not agglutinate dysentery bacilli was answered in the negative; but only four cases were tested and it is very easy to miss some strains of bacteria which are present in the intestine. As far as it goes the evidence seems to show that the agglutinin in the sera of healthy persons has nothing to do with a previous attack of dysentery. It is laid down that in order to diagnose dysentery of the Flexner variety an agglutination in a higher dilution than 1:100 must be obtained. Nevertheless amongst undoubted dysentery infections Sonne found:—

1 case with a titer	..	..	..	1 : 1000
1   "      "      "	..	..	..	1 : 250
2   "      "      "	..	..	..	1 : 100
1   "      "      "	..	..	..	1 : 50

This rather points to the clinical uselessness of the agglutination test unless a very high titer is found. This does not apply to the newly discovered Group III because it is found that normal sera practically never agglutinate these bacilli. [After reading the paper through one is left with the impression that the whole matter is still *sub judice* and that considerably more work in this direction is needed.]



**DUENNER (L.). Die Agglutination bei Ruhr und ruhrartigen Erkrankungen.** [Agglutination in Dysentery and Similar Diseases.]—*Berlin. Klin. Woch.* 1915. Nov. 15. Vol. 52. No. 46. pp. 1184-1185.

The outstanding feature of this article is that the author claims to be able to distinguish specific from non-specific agglutination by the density of the clumps formed. Coarse clumping of dysentery bacilli (all types) indicates a specific action; fine clumping even with a serum dilution of 1 : 640 is not considered diagnostic. The tubes are read with the naked eye after 24 hours in the incubator, and after shaking. An agglutination in a higher dilution of serum than 1 : 50 is diagnostic for Shiga. What is a significant agglutination, or in other words what is the upper normal limit for the Flexner-Y group, is not yet certain. [It cannot be too strongly emphasized that these limits are purely arbitrary and depend upon several factors such as the method of performing the agglutination test, and above all upon the susceptibility of the strain of bacilli used. Therefore if a worker does not know his strain, he should determine its upper normal limit for himself on a large number of normal sera.]

E. E. A.

**SELIGMANN (E.) & COSSMANN (L.). Zur Bakteriologie der Ruhr im Kriege.** [Bacteriology of Dysentery in the War.]—*München. Med. Woch.* 1915. Dec. 21. Vol. 62. No. 51. pp. 1768-1769.

The agglutination of Shiga dysentery bacilli by a patient's serum has diagnostic significance but the agglutination of Flexner-Y type is not significant. [Many authors are agreed that the upper normal limit for the latter is at least a serum dilution of 1 : 100. An agglutination in a serum dilution considerably above this would, in the present state of our knowledge, generally be considered specific.]

E. E. A.

**STRAUSS (H.). Ueber Serodagnostik larvierter Fälle von chronischer Dysenterie.** [Serum-diagnosis of Obscure Cases of Chronic Dysentery.]—*Deut. Med. Woch.* 1915. Sept. 2. Vol. 41. No. 36. pp. 1059-1060.

A plea for the investigation of cases of severe colitis by testing the agglutinating power of the patient's serum on dysentery and even typhoid bacilli. No hard and fast boundary can be drawn between chronic dysentery and "colitis gravis" or chronic haemorrhagic proctitis and Strauss has cleared up the diagnosis of several of these cases by proving them to be dysentery. Of 14 such cases four were proved to be caused by Shiga-Kruse, two by *B. dysenteriae* Y, and one by *B. typhosus*. In none of these cases could the specific bacilli be obtained from the stools and hence the importance of testing the blood. Dysentery agglutinins are well known to be stable, in accordance with which the author obtained a titre of 1 : 100 with Shiga-Kruse bacilli in a case that had had acute dysentery in South Africa 10 years previously and a 1 : 200 titre in another case that had suffered from the acute disease in Egypt 18 years ago. In some of

the cases gastric disturbance was a prominent symptom, to account for which it was found that the hydrochloric acid of the gastric juice was either absent or diminished in amount. Other authors have lately recorded the same thing. This abnormality apparently delays the return to health and therefore Strauss thinks that its correction (diet, HCl., etc.) is very important.

[The stability of agglutinins during such long periods as those mentioned above would rather suggest auto-infection on one or more occasions in a carrier. That agglutinins produced by one attack should be present in so high a titre for such a lengthy period is highly improbable.]

E. E. A.

**NÈGRE (L.). Infections à bacilles pseudo-dysentériques, en Algérie.**  
—*C. R. Soc. Biol.* 1916. Jan. 22. Vol. 79. No. 2. pp. 44–45.

A note on some bacilli isolated from the faeces of cases of fever of a typhoidal type in Algeria. None had dysenteric symptoms. The bacilli were not motile and for the most part fermented glucose with gas production, and clotted milk, a fortnight being sometimes necessary for the last reaction. Indol was produced in all cases. The patients' sera agglutinated their respective organisms in dilutions of the order of 1 : 2000 and 1 : 4000. These bacilli seem to be intermediate between *B. dysenteriae* Flexner and *B. coli*.

E. E. A.

**FRAENKEL (Ernst). Untersuchungen über Pseudodysenterie (Y-Ruhr).**  
[Investigation of Pseudodysentery (Y-type).]—*Deut. Med. Woch.* 1915. Sept. 30. Vol. 41. No. 40. pp. 1182–1183.

This is an account of a number of mild cases of dysentery. There were no deaths, and in 44 per cent. of the cases *B. dysenteriae* Y was obtained from the faeces. The bacillus was recovered from the stools of four patients after the fever was over, from another four during and also after the fever, and from the rest only during pyrexial attacks. The number of stools examined was 90. Using a medium containing bile, 49 blood cultures were made, one of which yielded dysentery Y. Cultures were also made from 36 urines with a positive result in one case (male), 9 test cases being taken to avoid faecal contamination, but no mention is made of a catheter being used.

Agglutination, to be of any diagnostic value for Y bacillus, should be positive in a higher dilution than 1 : 160 of the patient's serum. In order to make the agglutination test absolutely reliable it is necessary to test the patient's blood not only against dysentery bacilli, but also against typhoid and paratyphoid bacilli. Only when the agglutination of the dysentery bacillus is markedly greater than that of the others are we justified in making a diagnosis of dysentery. If this precaution is not taken, group agglutination of the dysentery bacillus caused by a previous attack of typhoid fever or an anti-typhoid inoculation may not be detected and lead to erroneous conclusions. Carriers of this type of dysentery seem to be uncommon. Out of some thousands of examinations of faeces and urine only two Y carriers (faeces) were found as against seven typhoid carriers.

E. E. A.

REMLINGER (P.) & DUMAS (J.). *La dysenterie de l'Argonne. Étude bactériologique.*—*Ann. Inst. Pasteur.* 1915. Oct. Vol. 29. No. 10. pp. 498-519.

There was a curious epidemic of diarrhoea among the troops in Argonne. It appeared to be either dysentery or paratyphoid fever. Two distinct dysentery bacilli were cultivated from the stools. One, which was found very frequently, was identical with the bacillus Y of Hiss; the other, which was only isolated a few times and then from the most serious cases, was related to *B. dysenteriae* Shiga, but was not agglutinated by Shiga serum.

E. E. A.

LEDINGHAM (J. C. G.) & PENFOLD (W. J.). *Serological Tests in Dysentery Convalescents.*—*Brit. Med. Jl.* 1916. Jan. 8. p. 47.,

The authors describe the results of testing the sera of 103 convalescents, the great majority of whom gave a history of dysentery. First of all they set out to determine the upper normal limit of agglutination of *B. dysenteriae* Shiga in 23 normal persons. In none of these did they obtain more than a slight agglutination in a serum dilution of 1:50. Out of the 103 convalescents 54 fell within the normal limits, while the remaining 49 gave a stronger agglutination and were therefore classed as Shiga dysentery cases.

WOODCOCK found 41 per cent. of these cases carried one or more of the following protozoa in the faeces—*Lamblia intestinalis*, *Trichomonas*, or *Entamoeba coli*. There was no definite association between these protozoa and the Shiga cases.

E. E. A.

#### FLAGELLATE DYSENTERY.

CASTELLANI (Aldo). *Treatment of "Flagellate Diarrhoea" and of Kala-Azar.*—*Brit. Med. Jl.* 1915. Nov. 27. pp. 779-780.

In the first part of this paper, the author states that trichomonad and cercomonad flagellates occur in the stools of about 25 per cent. of healthy persons in the tropics, as may be determined after the administration of saline purges. He refers to two cases published by him in 1905, wherein the flagellates were present in enormous numbers and were then probably pathogenic. Ipecacuanha and emetine have no effect on such flagellates. In 1905 the author found that after mixing a loopful of flagellate-containing stools with a loopful of methylene blue solution, 1 per 1,000, the flagellates took up the colour and became almost immediately quiescent and globular in shape. He recommends the use of "methylene blue by the mouth, in cachets containing 2 or 3 grains of the drug, three times a day, and also by intestinal irrigation (1 in 5,000 or 1 in 3,000)."

The treatment induces rapid decrease or complete disappearance of the flagellates within a very few days. It may be necessary to persist with the drug in a few obstinate cases, but it must be discontinued from time to time to prevent the formation of methylene blue concretions in the intestine.

H. B. F.

## CILIATE DYSENTERY.

BARLOW (Nathan). *Treatment of Hondurian Balantidiosis.*—*Southern Med. J.* 1915. Vol. 8. No. 11. pp. 937-938.

Human balantidiasis is not common in Honduras. Only two cases were found in a year. In both the parasite presented certain differences from the ordinary form of *Balantidium coli*. The cilia were not arranged in rows and there was no contractile vacuole, but the cytopyge or anus was contractile. The micronucleus was seen with difficulty. The author designates the parasite *Balantidium coli*, variety *hondurensis*.

The first patient gave a history of five days' diarrhoea, with eight or ten mucous stools daily, colicky pains, tenesmus, light fever and loss of appetite. The stools contained many balantidia and some blood, while hookworms were also present. Thymol did not reduce the number of the balantidia, so methylene blue was administered in two-grain doses, three times a day for two days, when there were no living ciliates to be found. Hookworms still being present, a second treatment of thymol was given. A second course of six two-grain doses of methylene blue was given as a precautionary measure. The patient had no more symptoms and gained in weight.

The second patient suffered only from balantidiasis, and at the time of admission was passing twenty stools daily, some of which contained blood. Magnesium sulphate was first administered and then one grain of emetine daily for two days. This failing to reduce the number of parasites, ipecacuanha was tried in the form of alcresta ipecac. In five days, no balantidia were found. After further precautionary treatment, the patient was clinically cured.

The author's conclusions are:—

"The balantidiosis of Honduras, if uncomplicated by pathogenic amoebae, is best treated by methylene blue, two grains three times daily, not less than four days.

"If an endamoebic or similar infection is also present, emetin combined with oral administration of some suitable form of ipecac will be appropriate for both infections. Especial stress must be placed upon the oral administration, and not less than ten days of continuous treatment be given.

"With either method, at least three thorough cleansings should be given the intestines, at the beginning, middle, and end of treatment. If hookworm be present, thymol may be given if the patient is not debilitated.

"While these results may hold good for the ordinary form of *B. coli*, the slight differences observed make it necessary to prove this point by actual experiment."

H. B. F.

ZULOAGA (Julio). *Balantidiosis.*—*Repert. Med. y Cirug.* 1915. Oct. Vol. 7. No. 1. [No. 73]. pp. 10-25. With 2 figs.

A very readable account of *Balantidium coli* and of the symptoms to which it gives rise in the human being, drawn from the author's personal experience. In Colombia, as elsewhere, pigs are the natural harbourers of this parasite, and it is only met with in human beings who have been in contact with them, or who drink water fouled by their excreta. For the same reason the disease is only to be met with, in the author's experience, at altitudes where the temperature lies between the extremes of 12° and 24° Centigrade, these medium climates being the only ones favourable to the breeding of domestic pigs.

J. B. N.

## MIXED AND UNCLASSED DYSENTERY.

**RAVAUT (Paul) & KROLUNITSKI.** *Epidémie de dysenterie amibienne avec présence, dans quelques cas, du bacille dysentérique. Rôle tout à fait secondaire de ce bacille. Traitement de la dysenterie amibienne par l'arsénobenzol.*—*Bull. et Mém. Soc. Méd. des Hôpit. de Paris.* 1915. Oct. 21. Vol. 31. 3 ser. No. 29-30. pp. 846-851.

An account of a small epidemic of dysentery. The patients were treated in the hospital for infectious diseases at Steenvoorde, a French town north east of Lille almost on the Belgian frontier. *B. dysenteriae* was recovered from 14 out of 64 stools examined. In many cases the patients' sera agglutinated Shiga, Flexner or another bacillus isolated in the laboratory. The authors were surprised to find that the anti-dysentery serum of Dopter failed to relieve the symptoms even in 60 cc. doses, although used in cases from which the Shiga bacillus had been isolated. Several patients harbouring dysentery bacilli did not present the clinical appearance of bacillary dysentery. Another odd fact was that dysentery bacilli were often found in mild cases but not in the severe ones, and a similar anomaly was noticed with regard to agglutination. To complete the unusual features of this epidemic several types of dysentery bacilli were found. There were African soldiers among the sick. They had contracted the disease abroad and had been treated for amoebic dysentery. The authors found dysentery bacilli in their stools but not the specific amoeba. Emetine did not give good results; washing out the bowel with a solution of silver nitrate was best. In a soldier from Normandy who had never quitted France, *Entamoeba histolytica* was found in association with dysentery bacilli. This was the key to the situation. This association of the two causative agents was then found in many of the other cases in hospital. The authors point out that in such circumstances *B. dysenteriae* occupies quite a subordinate position and it is most important to deal therapeutically with the amoeba.

Better results were obtained with arsenobenzol than with emetine.

E. E. A.

**LEDINGHAM (J. C. G.) & PENFOLD (W. J.).** *Recent Bacteriological Experiences with Typhoidal Disease and Dysentery. With Notes on the Protozoan Parasites in the Excreta* by WOODCOCK (H. M.).—*Brit. Med. Jl.* 1915. Nov. 13. pp. 704-711. With 4 figs.

This paper deals with the bacteriological diagnosis of cases with a history of acute dysentery, admitted to the King George Hospital. Coming from the Dardanelles district, the stools of these patients on admission were for the most part either normal or remained for some time unformed; only a few continued to discharge blood and mucus.

After detailing the laboratory methods devised to deal expeditiously with a rather large number of cases, the authors proceed to note the results obtained. Only one member of the Flexner-Y group of dysentery bacilli was isolated, which was completely agglutinated by its specific serum, but suspects were obtained probably belonging to this group although inagglutinable by the stock agglutinating serum.

The view is advanced that we are dealing with a group of high specificity, the several members of which can only be differentiated by an agglutinating serum prepared with one or more of their number. In contrast to this all the Shiga dysentery strains isolated have been easily agglutinated by the stock Shiga serum (at a dilution of 1 : 1500 to 1 : 4000). Fermentation tests may be deferred to a later date to confirm the agglutination when the latter is decisive.

Convalescents with few or no symptoms were examined once, usually with negative bacteriological findings but there were a few still passing blood and mucus or with loose motions. Shiga bacillus was isolated from 15 of these and it was found that the sera of the patients gave very high agglutination titres. The one undoubted case of Flexner-Y dysentery mentioned above was followed from start to finish in hospital. It began with high fever and the passage of blood and mucus. The bacillus obtained from the single case of dysentery which ended fatally was probably a member of this group although not agglutinated by the stock serum. The large gut showed intense inflammation post-mortem and the bacillus in question was obtained both from the colon and from the mucoid stools before death.

Details of the 15 cases are tabulated and afterwards attention is drawn to the interesting features. The stools were not all of the typical variety, some being watery with or without mucus and in two cases they were normal. This point is important with respect to the carrier question. The bacillus has been obtained at periods varying from one to four months after the onset in the present series of cases. On one occasion Shiga bacillus was isolated from the blood of a patient suffering from paratyphoid A fever during a pyrexial exacerbation. This is probably a unique finding, and must be looked upon as a dysentery carrier infected with paratyphoid A. These mixed infections perhaps constitute the most interesting section of the paper. They number four and may be detailed seriatim.

1. *B. paratyphosus* A was isolated from the blood of the case cited above on September 1st (fifth day of fever). An exacerbation of fever (so-called relapse) took place on October 6th. A pure culture of Shiga bacillus was obtained from the blood on October 11th.

2. Had dysentery in August with blood and mucus. Admitted to hospital on September 16th with slight diarrhoea and fever which lasted to September 23rd. *B. paratyphosus* A isolated from faeces on September 23rd.

3. Admitted September 16th. Fever from September 25th to October 11th. Blood culture negative on October 6th. On October 13th the patient's serum agglutinated *B. paratyphosus* B. On October 18th *B. dysenteriae* Shiga was isolated from the faeces.

*B. enteritidis* Gaertner was also obtained from this case.

4. Another case of convalescent dysentery showed a marked agglutination with Shiga. *B. paratyphosus* A was recovered from the faeces.

E. E. A.

An account is given by Dr. Woodcock of the intestinal protozoan parasites found in the faeces of 26 cases of dysentery or diarrhoea from the Dardanelles or France. The parasites observed were:—

	No. of cases.
<i>Lambliia intestinalis</i> (active and (or) encysted) ..	7
<i>Macrostoma mesnili</i> (active) .. .. .	6
<i>Trichomonas hominis</i> (active) .. .. .	3
<i>Cercomonas hominis</i> (active and encysted) ..	1
Active flagellates, not specifically determined (probably <i>Macrostoma</i> or <i>Trichomonas</i> )..	4
Coccidian cysts .. .. .	5
<i>Entamoeba coli</i> cysts .. .. .	6
<i>Blastocystis hominis</i> .. .. .	5

The author diluted the faeces with a little sterile saline solution and made films fixed wet with osmic-acetic acid solution. The film or smear was then dried and hardened in absolute alcohol. Giemsa's stain was employed. The essential features of the morphology of the parasites in the preceding list are given. The pathogenicity of the flagellates is discussed, *Trichomonas* and *Lambliia* being the most important. Three cases of lamblial diarrhoea, apparently uncomplicated by the presence of other organisms, are mentioned, and details are given of one of them. The use of turpentine [more particularly for *Trichomonas* diarrhoea] is noted.

H. B. F.

ISMAIL (Abd-El-Aziz). Cases of Diarrhoea from Gallipoli.—*Lancet*. 1915. Oct. 23. pp. 920-921. With 2 charts.

A record of 50 consecutive cases of diarrhoea treated in Cairo. Twenty of these were post-dysenteric diarrhoea, having had blood and mucus in the stools 3-10 days earlier. In 15 of these amoebae were found, while three more responded quickly to emetine and therefore probably had a similar origin. *B. dysenteriae* Flexner was isolated from the remaining two cases. The amoebic cases were much the milder. The temperature never rose above 38·4°, while in the bacillary cases it reached 39° and 40° and the disturbance was more severe.

Another group of five cases of diarrhoea had amoebae in their stools but no blood or mucus was passed. The symptoms were slight. temperature 37°-38°, abdominal colic, and occasional diarrhoea. Here the author contradicts his statement above by saying mucus was present in which amoebae were found. There was rapid improvement on emetine.

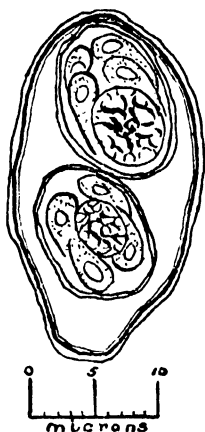
E. E. A.

WENYON (C. M.). Observations on the Common Intestinal Protozoa of Man. Their Diagnosis and Pathogenicity.—*Lancet*. 1915. Nov. 27. pp. 1173-1183. With 1 plate.

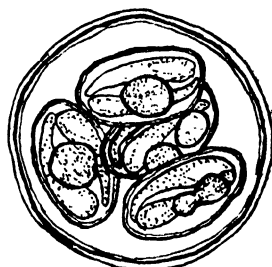
The Development of the Oöcyst of the Human Coccidium. An Addendum.—*Ibid*. Dec. 11. pp. 1296. With 4 figs.

Another Human Coccidium from the Mediterranean War.—*Ibid*. Dec. 25. p. 1404. With 1 fig.\*

The author describes the main morphological features, differential characters and life-cycles of *Entamoeba histolytica*, *E. coli*, *Amoeba (Vahlkampfsia) limax*, *Trichomonas intestinalis*, *Lambliia intestinalis*, *Tetramitus mesnili* and *Balantidium coli*. Mention is made of *Cercomonas*, *Bodo* and *Prowazekia* and their possible occurrence in human faeces. Also a few cases of the occurrence of Coccidian cysts, belonging to the genus *Isospora*, in human faeces are mentioned. The yeast-like organism, *Blastocystis hominis*, is discussed. All of these organisms have been described and their pathogenicity discussed in this *Bulletin*, from time to time, so that it is unnecessary to repeat well-known morphology and life-history.



Oöcyst of *Isospora*.



Oöcyst of *Eimeria*.

The author wisely advocates the examination of these intestinal protozoa in the fresh and living state, in *fresh* stools, and points out the use of dark-ground illumination. Faeces should be kept cool. The addition of iodine to stools on the slide in order to detect nuclei in cysts is recommended. For permanent preparations, smears of faeces, fixed with sublimate alcohol and stained with iron haematoxylin are recommended. The use of a micrometer scale in the eyepiece—for determining the dimensions of the structures observed—is also noted.

[Apparently the intestinal flagellates are not considered to be markedly pathogenic. ESCOMEL's work on *Trichomonas diarrhoea*

\*See also WENYON (C. M.). Observations on the Common Intestinal Protozoa of Man: Their Diagnosis and Pathogenicity.—*Jl. R. Army Med. Corps.*, 1915. Dec. Vol. 25. No. 6. pp. 600-632. With 2 plates and 60 figs. (Reprinted from the *Lancet*, Nov. 27th, 1915, with a new Appendix.)



[this *Bulletin*, Vol. 1, p. 719] is referred to, but it is stated that "this interesting work needs confirmation." LYNCH has already afforded confirmation in some respects [see this *Bulletin*, Vol. 6, p. 469]. No mention is made of MATHIS' important work on *Lamblia* [this *Bulletin*, Vol. 4, p. 315] and the opinions of several workers (positive as to pathogenicity) might have been mentioned. Thus, the views of BRUMPT, SMITHIES, and MELLO-LEITAO are summarised in this *Bulletin*, vol. 1, pp. 189, 469 and 718 respectively, also those of GÄBEL in this *Bulletin*, vol. 3, p. 465, and of several other authors in this *Bulletin*, vol. 4, pp. 314-318.]

In an addendum the author briefly describes two different kinds of coccidian oöcysts found in human faeces. The first note deals with oöcysts containing two sporocysts, each of which enclosed four sporozoites; such belong to the genus *Isospora*.

The second note is concerned with oöcysts belonging to the genus *Eimeria*. These oöcysts were nearly spherical with a diameter of  $20\mu$ . Four sporocysts, each containing two sporozoites, were present in an oöcyst, on the external surface of which small ridges occurred. The author notes that the oöcysts of *Isospora* were passed in a relatively immature condition, while those of *Eimeria* were mature when passed.

H. B. F.

FANTHAM (H. B.) & PORTER (Annie). **Notes on Certain Protozoa which may be found in Cases of Dysentery from the Mediterranean War Zone.**—*Proc. Cambridge Philosoph. Soc.* 1916. Jan. Vol. 18. Pt. 4. pp. 183-188. [Read Nov. 22, 1915.]

The authors record the essential features of the Protozoa they have personally investigated in cases of dysentery from the Mediterranean. The organisms considered are *Entamoeba histolytica* and *E. coli*; *Trichomonas hominis*, *Chilomastix (Tetramitus) mesnili*, *Giardia (Lamblia) intestinalis* and *Cercomonas hominis*; *Balantidium coli*. Of *Entamoeba histolytica* "the tetranucleate cyst is characteristic and diagnostic and the cysts are the infective stages." In the stools of subacute cases of amoebic dysentery examined by the authors uninucleate and tetranucleate cysts were observed. The flagellates are briefly described with references to the papers of those who attribute pathogenicity to them, and notes on geographical distribution and treatment. Spirochaetes, some of them resembling *S. eurygyrata* Werner, were found in the faeces of some patients. Under ciliate dysentery it is pointed out that swine-herding is an important occupation in Serbia and that therefore balantidial dysentery may occur in the troops operating there.

A. G. B.

ESCOMEL (Edmundo). **Las disenterias en Arequipa.** [Dysentery in Arequipa.]—*Cronica Med.*, Lima. 1915. Dec. Vol. 32. No. 630. pp. 297-351. With 1 coloured plate and 7 figs.

An exhaustive account of the various kinds of dysentery met with by the author in practice in Arequipa (Peru). The only kind missing from the list is bacillary dysentery. The author differs from the majority of nosologists in including non-contagious forms of enteritis

under the term dysentery, as for example the enteritis, or more properly proctitis, caused by the excessive consumption of red pepper (Aji). The diarrhoea incidental to cancerous ulceration of the bowel is also tabulated as a dysentery, rather needlessly, as it seems.

The classification adopted by the author is :—

1. Amoebic dysentery.
2. That due to *Trichomonas intestinalis* (Leuckart 1879), of which he has observed 152 cases. The author speaks of abscess of the liver as incidental to this form of infection and says that it should be treated by aspiration, with subsequent injection into the cavity of not more than 2 grammes of turpentine. Turpentine given by the mouth is also said to be a specific for this form of dysentery.
3. That due to *Tetramitus mesnili* (Wenyon).
4. That due to *Balantidium coli*.
5. That due to paludism. In the bowel-mucus of this form, according to the author, malarial pigment and cells containing haematozoa will be found.
6. Dysenteries due to ankylostomiasis, the consumption of red pepper, and cancer, as already mentioned.

The value of this paper is perhaps hardly in proportion to its length.

J. B. N.

Noc (F.). **Parasitisme intestinal en Cochinchine. (Nouvelle contribution à l'étude des dysenteries indo-chinoises.)**—*Bull. Soc. Path. Exot.* 1916. Jan. 12. Vol. 9. No. 1. pp. 15–20.

This paper is an analysis of the causes of chronic diarrhoea in French Cochinchine. They are as follows :—

1. Amoebic.
2. Combination of amoebic and bacillary.
3. Bacillary.
4. Any of the above in combination with *Trichocephalus*, *Lambliia* or *Trichomonas*.

The worm *Strongyloides* is frequently found in the intestine but it does not seem likely that it causes diarrhoea by itself. It may aggravate diarrhoea of a different origin.

E. E. A.

Ross (Ronald). **A Lecture on the Treatment of Dysentery. Delivered before the Royal Society of Medicine on Dec. 20th, 1915.**—*Lancet.* 1916. Jan. 1. pp. 1–7: and *Proc. R. Soc. Med.* [Occasional Lectures.] 1916. Jan. Vol. 9. No. 3. pp. 73–90.

After an historic survey of the treatment of the disease up to the present day, some facts are given concerning the dysentery of the war as seen in Egypt. Bacillary dysentery prevailed up till midsummer, but an epidemic of amoebic type made its appearance in July and August 1915. After September it began to get scarce again and was displaced by bacillary in the winter. The cases among the British troops were more severe than among the Indian soldiers, who are in contact with the disease from childhood. The usual emetine treatment

for amoebic cases was resorted to. A small number, 10 per cent.—20 per cent. of the patients were not benefitted by emetine, and they were mostly cases in which it had not been administered until rather late. Mixed amoebic and bacillary infections were frequently seen, sometimes complicated by typhoidal disease. Experience has taught that amoebic ulceration of the bowel may not always give rise to the well-known signs; in fact the author believes that the amoebae may cause extensive lesions without any signs whatever, and that the typical disease becomes manifest only after some secondary invasion of intestinal bacteria has taken place. On the strength of these veiled cases the medical officers have been giving emetine pretty freely to hospital patients in the same way that quinine is given to them in a very malarious locality. Sodium and magnesium sulphates are generally given in combination with emetine. There is a difference of opinion as regards the efficacy of anti-dysentery serum but many successes were seen. Bismuth, tannic acid and opium are useful. Adrenalin is recommended for the collapse often seen in severe cases. The wisdom of employing intestinal washes in early cases is questioned. Appendicostomy did not give encouraging results. The avoidance of liver abscess is one of the most important points to keep in mind when considering the treatment of amoebic cases. Abscesses continue to appear for years after the original attack and the only way to avoid this danger is to give emetine in convalescent cases every month or so. The author suggests grain doses should be given for three days every month until the patient is ready to work again, irrespective of whether any symptoms of dysentery remain or not. This plan should be adopted even in cases where a positive diagnosis of amoebic dysentery has not been made.

Ipecacuanha is useful in the later stages of the disease.

E. E. A.

- i. MARCOVICI (Eugen). **Zur Behandlung der akuten und chronischen Dysenterie mit Allphen.** [Treatment of Dysentery with Allphen.] — *Wien. Med. Woch.* 1915. Aug. 14. Vol. 65. No. 33. pp. 1239–1246. With 10 charts.
- ii. MARCOVICI (Eugen) & PŘIBRAM (Ernst). **Klinische und experimentelle Untersuchungen über die Wirkung von *Allium sativum* und daraus dargestellten Präparaten (Allphen) bei infektiösen Darmkrankheiten.** [Clinical and Experimental Investigations into the Action of *Allium sativum* and its Preparations (Allphen) in Infectious Intestinal Diseases.] — *Wien. Klin. Woch.* 1915. Sept. 16. Vol. 28. No. 37. pp. 993–997.

i. Allphen is a compound of garlic and salol [see later paper on the same subject]. Quite good results have been obtained by its administration in dysentery and in other infectious intestinal catarrhs, but not in intestinal tuberculosis or amyloid disease. Its mode of action is not yet clear.

ii. Marcovici has had extremely good clinical results in cases of dysentery, cholera and other diarrhoeas, with Allphen. This is a combination of garlic, obtained from the tuber of *Allium sativum*, with salol. The tubers must be carefully dried at a low temperature in a vacuum, powdered, and mixed with salol in the proportion of

0·5:0·15 respectively. The dose is 4 to 5 grams daily. In about five days acute cases were nearly normal again with normal formed stools except for the presence of a little mucus. Chronic cases took a little longer to cure but the action of the drug on them was very satisfactory. In the case of carriers the specific micro-organisms disappeared from the faeces in 4-5 days.

Pribram is responsible for the animal experiments. He started feeding rabbits with allphen but finding that long continued doses were toxic, he omitted the salol, giving the dry powdered garlic in doses of 2·5-5 grams daily. This could be continued for weeks without the slightest injurious effects. By feeding a few days in advance it was found to protect against 10 lethal doses of the toxin of Shiga's bacillus introduced into a vein. Further it rendered small doses of the living bacilli themselves innocuous (0·1 drop of a virulent strain intravenously).

E. E. A.

du MONT. **Behandlung von Ruhr und ruhrähnlichen Darmkatarrhen.** [Treatment of Dysentery and Similar Diseases.]—*Deut. Med. Woch.* 1915. Sept. 9. Vol. 41. No. 37. p. 1101.

The author recommends injections of a cup of warm water containing 0·5 gram dermatol and 15 drops Tct. Opii at first thrice daily, which should be decreased to twice and once daily *pari passu* with the fall in the number of stools.

At one time the author was unable to obtain dermatol and substituted 100 grams "Bolos" in combination with the same amount of Tct. Opii as before in  $\frac{1}{2}$ — $\frac{3}{4}$  litre of water. The injections were retained for one to three hours and then only partially voided. A strict oatmeal diet was enforced. Sixty cases were treated thus with excellent results, most of them being able to work again in two or three days. ["Bolos" is aluminium oxide. Its use is to adsorb any toxins it comes in contact with.]

E. E. A.

ARNOLD (W. J. J.). **Sodium Sulphate in Dysentery and Infantile Diarrhoea.**—*Brit. Med. Jl.* 1916. Jan. 8. p. 49.

The author uses sodium sulphate in a dose of 5-15 grs. every two or three hours for children under one year. A preliminary dose of castor oil is recommended. Milk is excluded from the diet for a few days. The mortality is reduced to an almost negligible quantity by this treatment of infantile diarrhoea.

Dysentery should be treated by 1 drachm doses, every hour or two. The frequency of dosage decreases as the condition improves. This applies to both amoebic and bacillary dysentery. If amoebae persist, emetine should of course be given.

E. E. A.

**BALFOUR (Andrew).** *Notes on the Treatment of Diarrhoea and Dysentery issued by the Advisory Committee for the Prevention of Epidemic Diseases in the Mediterranean Expeditionary Force.*—*Jl. R. Army Med. Corps.* 1915. Nov. Vol. 25. No. 5. pp. 473-481.

As its title suggests this is a semi-official communication dealing with the common forms of treatment in use for the various types of dysentery and diarrhoea. It is meant for doctors who are not familiar with dysenteric disease, and does not contain any new lines of treatment.

E. E. A.

**GLASSON (C. J.).** *Bismuth—X-ray Localisation of Dysenteric Ulceration.*—*Proc. Roy. Soc. Med.* 1915. Dec. Vol. 9. No. 2. Med. Section. pp. 39-50.

The technique is as follows :—

Bismuth subnitrate is given in 60 grain doses every two hours for at least six days. On the sixth day a radiogram is taken, the bismuth is discontinued, and liquid paraffin is administered in 2 dr. doses every two hours for 24 hours. A second radiogram is then taken which will show the position of any ulcerative patches.

It is pointed out that the method may be useful to practitioners in chronic cases. Several cases are described and radiograms reproduced. One of the cases died, and the lesions seen post-mortem agreed with those shown by the radiogram. All the cases were amoebic dysentery. The paraffin is given to clear the excess of bismuth from the bowel, when a certain amount is left behind in the ulcerated patches.

E. E. A.

**HIRSCH (C.).** *Ueber Ruhr und ihre Behandlung im Felde.* [Dysentery and its Treatment.]—*Deut. Med. Woch.* 1915. Sept. 30. Vol. 41. No. 40. pp. 1179-1182.

This article is a lengthy statement of the author's views about dysentery. The first portion deals with the various causes, and attention is called to the multiplicity of possible aetiological factors some of which are purely hypothetical, for instance other bacteria and protozoa than those already discovered. Other factors, which usually receive scant consideration, are irrational diet, chemical poisons, etc. In the latter half of the paper, dealing with treatment, there is nothing really new. For the tenesmus the author recommends rectal injections of animal blood-charcoal, one heaped-up tablespoonful to the litre of warm salt solution.

E. E. A.

**WHITTAKER (H. A.).** *A Water-borne Dysentery Epidemic. Caused by using Water from an Auxillary Fire Connection.*—*U. S. Public Health Rep.* 1915. Nov. 26. Vol. 30. No. 48. pp. 3473-3475. With 1 diagram.

An account of an outbreak of dysentery occurring among the employees of a stock yard company at St. Paul, Minnesota. About 80 were smitten, most of them on the same day, October 21st, 1914.

In times of stress the water supply from wells was augmented by another from the Mississippi River, which presumably conveyed the infection in this instance. Enquiry elicited the fact that on October 19th and 20th the river water supply was drawn upon, which analysis proved to be contaminated. No further information either about the disease or the "contamination" is given.

E. E. A.

DALE (H. H.). **A Preliminary Note on Chronic Poisoning by Emetine.**  
—*Brit. Med. J.* 1915. Dec. 18. p. 895.

Experiments have been started to inquire whether repeated doses of emetine can produce cumulative poisoning. Cats and rabbits received doses which corresponded to rather more than  $1\frac{1}{2}$  grains for an average man. This dose is somewhat in excess of that usually administered to man, but was deliberately chosen in order to obtain some information on this important subject without delay. Although care is needed in applying the results obtained in the lower animals to man, the author feels justified in announcing that there is definite evidence of cumulative poisoning.

E. E. A.

VELAZCO (Luis V.). **Un caso de intoxicación por el clorhidrato de emetina.** [A Case of Poisoning by Chlorhydrate of Emetine.]—*Gaceta Med. de Caracas.* 1916. Jan. 15. Vol. 23. No. 1. pp. 7-8.

**A case of intoxication by chlorhydrate of emetin.**

The patient was a woman, aged 20 years, who was admitted to hospital for symptoms, of three months' duration, of amoebic dysentery. Treatment was begun with a single injection of 6 centigrammes of the alkaloid, followed by eleven more of 3 centigrammes each, given on 12 consecutive days. This produced no untoward result, and the dysentery having improved, the treatment with emetin was discontinued and replaced by the administration of astringents. After a month's interval, the dysentery not having wholly subsided, the treatment with emetin was resumed, and eight consecutive doses of 6 centigrammes each were given on the same number of days. Unpleasant symptoms of the nature of paralysis then supervened, which compelled the immediate discontinuance of the drug. The patient began to complain of loss of power in all the extremities with a feeling of laxity in the spine, so that the act of sitting up produced intense weariness. Upon testing, the skin of the whole surface of the body was found to be more or less analgesic, though tactile and thermic sensibility were preserved, and sense of position. Patellar and ankle reflexes were preserved, but the periosteal and tendinous ones were absent. Babinsky's, Gordon's and Oppenheim's signs could be elicited on the left side. The plantar reflex was abolished; the abdominal ones preserved. The pupils contracted normally. The pulse was accelerated and weak, 144 to the minute. The bowels had been confined for four days. Examination of the cerebro-spinal fluid showed a strong leucocytic reaction (neutrophile polynuclears 61 per cent., large mononuclears 18 per cent., lymphocytes 21 per cent., and eosinophiles none). Urine, no albumin or sugar. Electrical testing showed Erb's and Duchenne's phenomena to be present. Deglutition was somewhat difficult, while the palate was flaccid.

For the relief of these symptoms, which were at once ascribed to the emetin, two parallel rows of cautery points were applied to the whole length of the spine, and an injection of sulphate of apapartin was given.

The symptoms gradually subsided upon discontinuance of the emetin, and at the end of a month were wholly gone, the difficulty of deglutition and the sense of muscular weakness being the last to disappear.

The author has since come upon the record of an exactly similar case in the *Presse Médicale* of Paris for April 15th, 1914, by SPREHL and COLLARD, as the result of giving daily doses of 6 to 9 centigrammes of emetine, which he quotes at length. The conclusion drawn is that emetin should be given in doses not larger than 5 to 10 centigrammes daily for not more than five days in succession, an interval of at least five days being allowed to elapse before the treatment is resumed.

J. B. N.

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## CHOLERA.

MUELLER (Paul Th.). **Ueber Choleramassenuntersuchungen.** [Cholera Diagnosis on a Large Scale.]—*München. Med. Woch.* 1915. Nov. 30. Vol. 62. No. 48. pp. 1659–1660.

An examination for cholera carriers on a large scale (several battalions), which differed from the usual in that the faecal specimens were examined 10–12 mixed together, and only when *V. cholerae* had been detected in one of these groups, was the group examined individually. The author fell upon this plan owing to the shortness of time and means at his disposal, and decided that at any rate the more dangerous carriers, those excreting large numbers of vibrios, would not escape detection owing to the modification of method adopted.

H. Schütze.

SCHUERMANN (W.) & FELLNER (T.). **Zur bakteriologischen Cholera-diagnose.**—*Deut. Med. Woch.* 1915. Sept. 30. Vol. 41. No. 40. pp. 1183–1184.

To test the efficacy of ARONSON'S cholera medium, which is an alkaline agar plus cane sugar, dextrin and fuchsin decolourised with sodium sulphite, the authors compared it with Endo's medium and Dieudonné's. Imitation cholera stools were prepared by thinning normal faeces with peptone water and adding *V. cholerae* (12 strains tested) in quantities of 1/100–1/1,000,000 of a loop per 5 cc. stool. The plates were spread without enrichment and examined after 18–20 hours' incubation.

The authors decided that Aronson's medium is to be preferred on account of the ease with which the red coloured cholera colonies are detected and because the medium is more easily prepared and immediately ready for use. Neither agglutination nor motility is impaired after growth on Aronson. While cholera-like colonies are indistinguishable from those of the true Koch vibrio, they show no tendency to oust *V. cholerae* from the plates even when these cholera-like vibrios predominate in a mixture of the two.

Four of seven stools from suspected cholera cases, finally, gave similar results on Aronson and Dieudonné; three times however *V. cholerae* was isolated from Aronson but not from Dieudonné.

H. S.

BOETTICHER (Eduard). **Die bakteriologische Choleradiagnose, unter besonderer Berücksichtigung der von Aronson und Lange neuerdings angegebenen Choleranährböden.** [Bacteriological Cholera Diagnosis, with special Reference to the New Media of Aronson and Lange.]—*Deut. Med. Woch.* 1915. Oct. 28. Vol. 41. No. 44. pp. 1303–1305.

In experiments carried out with cholera cultures and artificially infected stools, the author came to the conclusion that the Aronson medium (100 cc. 3 per cent. agar + 6 cc. 10 per cent. anhydrous soda + 7.5 cc. 20 per cent. cane sugar + 0.4 cc. concentrated alcoholic fuchsin + ca. 0.7 cc. 10 per cent. sod. sulphite) [this *Bulletin*, Vol. 6, p. 495] owing to its not giving a massive growth of *V. cholerae*, can



not supplant Dieudonné, but that by reason of its marked alkalinity repressing the growth of *B. coli*, its colour reaction indicating the cholera colony and simplifying the task of diagnosis for the less experienced, and by reason of its giving a more easily agglutinable culture than does Dieudonné, it is a valuable resource in the absence of alkaline haemoglobin media (Dieudonné and Esch). Lange's agar (1 part 5 per cent. starch solution + 6 parts alkaline agar containing 40 cc. of 10 per cent. sod. carb. to 1000 cc. neutral agar) [this *Bulletin*, Vol. 6, p. 499] on the other hand does not differentiate *V. cholerae* sufficiently from a number of other stool bacteria which also attack starch, nor when it is used may a stool be thickly plated owing to the presence of diastatic ferments which would render the whole plate transparent.

H. S.

**STERN (Wilhelm). Vergleichende Untersuchungen mit festen Cholera-Elektivnährböden. Ergänzung zur Aronsonschen Methode.** [A Comparative Examination of Cholera Media: Aronson's Method Supplemented.]—*Wien. Klin. Woch.* 1915. Dec. 16. Vol. 28. No. 50. pp. 1383-1385.

After comparing the cholera media of Dieudonné and Esch with Aronson's fuchsin sugar medium [this *Bulletin*, Vol. 6, p. 495], using pure cultures of various intestinal bacteria and artificially infected stools, and finding that Aronson's was more selective than the other two, the author had an opportunity of testing the three in a small cholera outbreak.

The table shows that the superiority of Aronson's medium was again proved, in that while fewer plates showed growth and thus needed attention, a larger number of positive findings were obtained on it.

Of the 75 stools examined.

Plates.	Showed growth.	Were positive.
Dieudonné's blood-alkali agar ..	40	9
Esch's sodium-meat-agar ..	42	9
Aronson's fuchsin-sugar-agar ..	26	12

Another feature in its favour was the ease with which *V. cholerae* colonies grown on Aronson emulsified, as is well known colonies from Dieudonné sometimes emulsifying so badly as to render an agglutination test impossible until an ordinary agar subculture has been obtained.

One difficulty in the use of Aronson's medium appears to be the presence of glycolytic ferments and coli strains which split, though slowly, the sugars, thus simulating and obscuring the cholera colonies.

The author prepares a liquid modification of Aronson—2 per cent. peptone, 2 per cent. dextrin, 2 per cent. cane sugar and 0.5 per cent. NaCl [? in water], filtered and 2.5 cc. [? to 100 cc. solution] of a 100

per cent. [? 10 per cent. meant]  $\text{Na}_2\text{CO}_3$  solution is added ; the whole is boiled and filtered and to 200 cc. are added 0.2 cc. of 10 per cent. fuchsin and 2.5 cc. freshly prepared 10 per cent. sodium sulphite. This medium is said to become red within eight hours only when inoculated with *V. cholerae*, as opposed to all other intestinal bacteria except the cholera-like vibrios.

H. S.

CASTELLI (Giorgio) & VIGANÒ (Luigi). **A proposito della diagnosi batteriologica rapida del colera.** [On the Rapid Bacteriological Diagnosis of Cholera.]—*Policlínico*. Sez. Prat. 1916. Feb. 27. Vol. 23. No. 9. pp. 261-268.

With the experience of the examining of several thousand specimens at the Istituto Sieroterapico in Milan, the authors discuss the various cholera media, describe those methods [the usual ones] adopted by themselves and are of the opinion that Aronson's cholera medium is to be recommended on account of the ease with which the cholera colonies on it are picked out and on account of the precision with which the alkalinity of the medium can be established, an important detail, which in Dieudonné's medium with a varying alkali-protein compound is not possible. They find however that STERN's liquid modification of Aronson [see above] is not satisfactory in that a red colour develops equally well as a result of glycolytic ferments and a whole series of saccharine fermenting organisms being present, which organisms would on the solid medium have been distinguishable from *V. cholerae*. [No details of any comparative experiments given at all.]

H. S.

KOEHLISCH & OTTO. **Vergleichende Untersuchungen und Versuche mit einigen Cholera-Elektivnährboden. Ein neuer Elektivnährboden..** [A Comparative Examination of Some Selective Cholera Media and a New One.]—*Zeitschr. f. Hyg. u. Infektionskr.* 1915. Oct. 26. Vol. 80. No. 3. pp. 431-446.

A concise summary of recent opinion on selective cholera media, and original comparative experiments which tend to show that Pilon's medium (Dieudonné's modified by the addition of sodium carbonate in place of caustic soda) surpasses the others, including their own new medium, an alkaline cheese agar which was desired to contain a more readily obtainable ingredient than blood, namely, soft milk cheese. The experiments were carried out with cholera and coli cultures and cholera-free stools, there being no cholera stools available.

H. S.

BALDONI (Alfredo). **Rilievi di tecnica sulla diagnosi batteriologica del colera nell'attuale profilassi.** [The Bacteriological Diagnosis of Cholera.]—*Policlínico*. Sez. Prat. 1916. Jan. 2. Vol. 23. No. 1. pp. 3-4.

In certain cholera cases and carriers the author, while able on examining the stool-peptone water cultures microscopically to discover a few typical looking vibrios, was yet unable to obtain cholera colonies

on plating from the peptone water on to Dieudonné or any of the usual cholera media, and that even after prolonged incubation of the peptone water. On varying the technique however he succeeded. Subcultures were made from the surface of peptone water to peptone water every four hours; after the second or third transplantation it was possible to get colonies to grow on Dieudonné. The organisms thus isolated were in every way typical. An explanation of this difficulty of isolation is put forward by the author, who suggests that prophylactic inoculation by reason of the antibodies produced may have altered the cultivability of the organism and that only after a number of generations in a liquid medium does normality in this respect return.

H. S.

SOBEL (Leo Lucius). **Praktische Nährböden zur Diagnose von Cholera, Typhus und Dysenterie.** [Simple Media for the Diagnosis of Cholera, Typhoid and Dysentery].—*Deut. Med. Woch.* 1915. Dec. 30. Vol. 41. No. 53. p. 1573.

Searching for some cheap, easily obtainable substitute for peptone and meat extract as ingredients of culture media, the author tried Pilsen beer. Half a litre, heated to drive off the alcohol + water to 1 litre + 15 gm. agar + 5 gm. lactose + 1 gm. Congo red (or Litmus) gave two media on which cholera, typhoid, dysentery and coli bacteria were found to grow well and with colour reactions according to whether lactose was fermented or not.

H. S.

YAKIMOFF (W.-L.) & DEMIDOFF (A.-P.). **Choléra et Dysenterie amibienne.**—*Bull. Soc. Path. Exot.* 1915. Nov. Vol. 8. No. 9. pp. 641-643.

A short account of the examination method employed at the laboratory with the Russian army of the Caucasus, attention being drawn to the necessity in hot countries of searching the stools of cholera suspects for amoebae as well as *V. cholerae*. The former, as the authors found in two cases, may give rise to the most pronounced choleraic symptoms. In 140 stool examinations, *V. cholerae* was found in 36 cases, amoebae in 16, amoebae plus *V. cholerae* in six and in one case *V. cholerae* together with *Lamblia intestinalis*.

H. S.

LOEWY (Otto). **Bilden Choleravibrionen Hämotoxine?** [Does *V. cholerae* produce Haemotoxins?].—*Centralbl. f. Bakt.* 1. Abt. Orig. 1915. Jan. 15. Vol. 75. No. 4. pp. 319-329.

An examination of 103 cholera strains (51 coming from the 1913 Roumanian epidemic, 21 from the 1912 one in Bulgaria, 4 from Galicia and 27 being older laboratory cultures) and of 11 El Tor and cholera-like strains. Only three of the true choleræ failed to agglutinate right to the titre limit of a cholera serum, whereas of the cholera-like strains only four of the 11 agglutinated so far. With regard to the production of haemotoxins, it was found that none of the 103 cholera strains either caused haemolysis when grown on sheep or goat blood

agar, or formed haematoxins after five days' growth in broth (the test for haemotoxins being carried out here by centrifuging the broth culture and adding 0.1–1.0 cc. of the supernatant to 2 cc. of a 5 per cent. guinea-pig or rabbit blood emulsion and incubating at 37°), whereas in the case of all the El Tor and cholera-like strains haemolysis took place in both experiments.

On the other hand a proteolytic ferment, capable of destroying and bleaching haemoglobin once it has been set free from the corpuscles and which is probably identical with the gelatine liquefying one, is produced by all the vibrios irrespective of whether they can occasion true haemolysis or not.

H. S.

GAUDUCHEAU (A.) & PELTIER (M.). *Sur quelques caractères d'un vibron cholérique du Tonkin.*—*Bull. Soc. Méd.-Chirurg. Indochine.* 1915. Mar. Vol. 6. No. 3. pp. 105–107.

A description of a cholera strain isolated in Tonkin which differed from their laboratory strain (Bombay) in producing a pellicle on liquid media very slowly and in agglutinating with typical cholera serum very unready and to a lesser extent after a period of cultivation on artificial media.

H. S.

BAIL (Oakar). *Untersuchungen über die Veränderlichkeit von Cholera-vibrionen.* [Experiments on the Variability of *V. cholerae*.]—*Cent. f. Bakt.* 1. Abt. Orig. 1915. Dec. 29. Vol. 77. No. 3. pp. 234–248.

After finding that a saline emulsion of a cholera strain freshly isolated at the German front and left standing at 42° for eight days gave atypical as well as typical colonies when plated on to agar, the author examined the strain for variation forms. These forms were then seen to be characterised chiefly by an altered colonial appearance when grown on agar, but also by a difference in the morphology of the vibrio itself, though this point was not closely followed by the author; the agglutinability of the strain was not found to be different in any of the forms.

The chief variations in colonial appearance were broadly speaking a wrinkled form resembling *B. mesentericus* and a half-wrinkled form intermediate between this and the typical smooth cholera colony. The wrinkled form was obtained first and resulted from the eight days keeping of a saline cholera emulsion at 42°; here on plating only 10 per cent. of the colonies presented a smooth typical appearance, the remainder being wrinkled atypical forms. Subcultures made from these on to broth or peptone water for 1–2 hours at 37° and then on to agar plates (the so-called short generation subculture) resulted in the wrinkled form splitting after the second subculture into the wrinkled and half-wrinkled forms, which then by remaining unaltered through a series of 26 short generation subcultures appear to have become perfectly stable, the unwrinkled types giving only unwrinkled

colonies and the half-wrinkled types only half-wrinkled ones (in this the author confirms BAERTHLEIN, who also found that variation forms remain constant when frequently subcultured, but tend to revert if not). This stability only continued if the subcultures were short generation ones.

At the 16th short generation subculture of these three types, they were inoculated into broth and on to agar at room temperature and after 30 days plates made therefrom. The smooth typical form gave again only smooth colonies, but the half-wrinkled form gave, besides half-wrinkled colonies, about 10 per cent. of a new dry, very finely wrinkled type which, however, after two short generation subcultures developed into the usual wrinkled form as which it then remained.

More remarkable still was the result on subculturing from the old culture of the wrinkled type; here but one sort of colony grew—a form differing from the typical mother type only by a certain flatness; no trace of wrinkling remained and in three short generation subcultures the organism had reverted in all respects to the original smooth typical form. Simply by subculturing from old cultures it was thus possible to convert some of the half-wrinkled forms into wrinkled ones and to recover the smooth typical form from the wrinkled one, though subsequent repetitions of the experiment showed that the percentage of colonies showing these changes varies from time to time.

Apart from these two variation types, a great number (over 30) of other intermediate forms were observed; in none of them however was the same degree of stability seen; these unstable forms were obviously but temporary stages held as the organism passed from one stable form to another.

It appeared to the author that, as most observers of cholera variation have seen no forms really differing more widely from one another than those recorded here, there must be but a limited range of variation possible to *V. cholerae* and that it is not to be expected that totally different forms could arise.

The author sees the possibility of some factor, e.g., the ageing of a culture, awaking the variation tendency in a cholera strain and resulting in the production of, say, the wrinkled form, which is then stabilised and made heritable by some other influence, perhaps an unaccustomed temperature or product of metabolism, acting upon it; he sees the possibility then of a bacteriologist being faced with what looks most unlike *V. cholerae* but, as the agglutination would show, undoubtedly is.

H. S.

ROHBERG (David N.). I. The rôle played by the Insects of the Dipterous Family Phoridae in Relation to the Spread of Bacterial Infections. II. Experiments on *Aphiochaeta ferruginea* Brunetti with the Cholera Vibrio.—*Philippine Jl. Sci.* Sect. B. Trop. Med. 1915. Sept. Vol. 10. No. 5. pp. 309–336.

The species *Aphiochaeta ferruginea* belonging to the *Phoridae* family of the *Diptera* is a frequent breeder in human faeces and of such small size that the flies can pass through the meshes of ordinary flyproof gauze. Recognising its possible danger as a distributor of cholera

organisms the author therefore examined it, as described in the second part of this paper, to decide the following points:—(1) Whether or not cholera vibrios are harboured during the chrysalis stage. (2) Is infection transmitted from the chrysalis stage to the imago? (3) Do adult flies, when fed on cholera vibrios, harbour these organisms on their surfaces or in their intestinal tracts; and for what length of time do they remain infective?

After giving the method of trapping and identifying flies, the paper goes on to describe the difficulty of keeping larvae alive in a pure culture of cholera vibrios until the adult form emerges. It was found necessary to have a medium with as little putrescible material as possible, to take larvae almost ready to pupate and to place them on sterile sand which was repeatedly wetted with cholera broth culture, sterile egg albumen serving as food for the larvae.

Pupae that subsequently developed were taken, washed in lysol, then in sterile salt solution and finally in peptone water, which served as control for the total removal of vibrios from the surface and did in fact never show growth of *V. cholerae*. Such pupae on being crushed in a further peptone water tube gave a growth of *V. cholerae* as well as of a coccus and a spore bearer. A larva still actively moving taken later in the experiment from the sand and treated in the same way as the pupae had been, except that in this case the extremity openings were closed by searing with a red-hot metal rod, gave no vibrios on crushing, but at the same time it was found that *V. cholerae* had died out of the sand bed from which the larva had been taken. Flies on emerging from the pupae were immediately chloroformed and washed and crushed as the pupae had been, care being taken that the sand had been kept infected with cholera vibrios. On crushing, the flies gave *V. cholerae* cultures.

Adult flies were given access to both faeces and cholera culture for 14 hours; they were then kept in glass flasks and subsequently examined for the comma bacillus. Ten hours after feeding a fly proved to be infected with *V. cholerae* externally and probably internally as well; after 24 hours only internally were vibrios found and after 34 hours not at all.

H. S.

GREIG (E. D. W.). **The Vibricidal Power of the Bile of Animals after Administration of Hexamethylene Tetramine and its Compounds.**—*Indian Jl. Med. Research.* 1915. Apr. Vol. 2. No. 4. pp. 907-925.

In an attempt to apply chemotherapy to the cure of cholera carriers, the author selected urotropine and its two compounds, new urotropine or helmitol, and cystopurin. Rabbits received large doses by means of a stomach tube and on dying or being killed the bile was removed and examined. Helmitol appeared to be the most toxic. Notwithstanding the alkalinity of the bile helmitol, in the one sample that was examined chemically, was found to have split up and liberated formaldehyde. The results obtained in the examination of the disinfecting properties acquired by the bile of treated animals are shown in the following three tables.

TABLE VII.—Helmitol. [GREIG (E. D. W.).]

Periods after mixing when samples were taken from the dilution.		1-1,000.		1-10,000.		1-100,000.	
		Bile of untreated animal.	Bile of treated animal.	Bile of untreated animal.	Bile of treated animal.	Bile of untreated animal.	Bile of treated animal.
1. Immediately ..	..	Numerous (about 1,660)	75	..	..	..	..
2. After 25 minutes	..	..	80	..	..	..	..
3. " 60 "	..	..	..	..	..	..	..
4. " 22½ hours	..	Very numerous.	..	..	..	..	..
1. Immediately ..	..	..	..	146	5	..	..
2. After 20 minutes	..	..	..	130	..	..	..
3. " 60 "	..	..	..	..	..	..	..
4. " 85 "	..	..	..	..	..	..	..
5. " 22½ hours	..	..	..	Very numerous. Uncountable	..	..	..
1. Immediately ..	..	..	..	..	..	10	1
2. After 35 minutes	..	..	..	..	..	12	..
3. " 60 "	..	..	..	..	..	12	..
4. " 85 "	..	..	..	..	..	13	..
5. " 22½ hours	..	..	..	..	..	..	..

Number of colonies of cholera vibrio furnished by 5 c.mm. of the following dilutions in bile of animals untreated, and treated with helmitol:—

TABLE VIII.—Urotropine. [GREIG (E. D. W.).]

Periods after mixing when samples were taken from the dilutions.		1-1,000.		1-10,000.		1-100,000.	
		Bile of untreated animal.	Bile of treated animal.	Bile of untreated animal.	Bile of treated animal.	Bile of untreated animal.	Bile of treated animal.
1. Immediately ..	..	..	..	..	..	..	..
2. After 30 minutes ..	..	..	..	..	..	..	..
3. " 60 "	..	Very numerous.	22	..	..	..	..
		Uncountable					
1. Immediately ..	..	..	..	129	48	..	..
2. After 30 minutes ..	..	..	..	134	38	..	..
3. " 60 "	..	..	..	104	68	..	..
4. " 23 hours ..	..	..	..	Very numerous.	3	..	..
1. After 23 hours ..	..	..	..	..	..	53	..

Number of colonies of cholera vibrio furnished by 5 c.mm. of the following dilutions in bile of animal untreated, and treated with urotropine.



TABLE IX.—Cystopurin. [GREIG (E. D. W.).]

Periods after mixing when samples were taken from the dilution.		Number of colonies of cholera vibrio furnished by 5 c.mm. of the following dilutions in bile of animals untreated, and treated with cystopurin:—					
		1-1,000.		1-10,000.		1-100,000.	
		Bile of untreated animal.	Bile of treated animal.	Bile of untreated animal.	Bile of treated animal.	Bile of untreated animal.	Bile of treated animal.
1. Immediately ..	..	311	181	..	..	..	..
2. After 60 minutes	..	257	154	..	..	..	..
3. " 24 hours	..	Very numerous.	23	..	..	..	..
		Uncountable					
1. Immediately ..	..	..	..	30	41	..	..
2. After 60 minutes	..	..	..	54	34	..	..
3. " 90 "	..	..	..	55	34	..	..
1. Immediately ..	..	..	..	..	..	3	2
2. After 60 minutes	..	..	..	..	..	3	..

In his consideration of the results the author remarks "it will be seen that the bactericidal power of the bile of animals after administration of helmitol and urotropine is well marked in respect of the cholera vibrio. It would appear from the experiments that the bile of the treated animal must remain in contact with the vibrios for some time to effect their complete destruction." Watery solutions of these drugs acting directly on the cholera vibrio are disinfectant only in the case of helmitol. The presence of normal bile does not influence this action, so that one may conclude that any quantity reaching the gall bladder will retain its full effectiveness. The author suggests the use of the drug from early convalescence onwards in cholera and that it may also be the means of preventing the carrier condition after other diseases such as typhoid.

H. S.

GREIG (E. D. W.). **On the Production of Gall-stones in Rabbits following Intravenous Inoculations of Cholera-like Vibrios.**—*Indian Jl. Med. Res.* 1915. Oct. Vol. 3. No. 2. pp. 259–265. With 1 coloured plate.

An account of two rabbits inoculated intravenously for long periods (three and six months) with cholera-like vibrios, one isolated from the stool of a case of cholera, the other from water. Both rabbits died and showed at post-mortem distended gall-bladders full of minute calculi and in the case of the rabbit inoculated for six months a large calculus blocked the mouth of the cystic duct. In each case the respective cholera-like vibrio was isolated in pure culture from the gall bladder and, seeing that the last inoculation had taken place about six weeks before death, each animal must be said to have become a carrier.

H. S.

McLAUGHLIN (Allan J.). **The Control of Asiatic Cholera on International Trade Routes.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1916. Jan. Vol. 3. No. 7. pp. 392–399.

In the main an account of the methods adopted in American ports for the examination of suspected cholera carriers. The specimens are secured (except in the case of children and those with diarrhoea where a rectal tube with several "eyes" serves) by the administration of a saline purge. There follows the usual inoculation into peptone water with incubation for six hours, a sub-culture on further peptone water being carried out if the specimens cannot be examined before eight hours. Smears are made and stained with fuchsin and those showing curved vibrio-like rods indicate which specimens are to be plated. The agglutination test is the final one and is carried out direct from the culture on the agar plate. Two new media in place of peptone water, suggested by GOLDBERGER, are approved of by the author as allowing of relatively large sowings of faeces and as favouring the multiplication of cholera vibrios while restraining that of the ordinary faecal bacteria; they are an alkaline egg peptone and an alkaline meat infusion peptone. [No further details given.]

H. S.

**CARTRON.** *Note sur le fonctionnement des "Postes de Savonnage" dans la province de My-tho.*—*Bull. Soc. Méd.-Chirurg. Indochine.* 1915. July. Vol. 6. No. 7. pp. 241-245.

The French authorities in My-tho (Cochin-China) decided to provide the means by which the natives would be able to wash their hands in a disinfectant on leaving houses suspected of harbouring cholera patients or carriers and before taking meals, in particular funeral meals, hoping in this way to limit the spread of the disease; the inhabitants and local chiefs throughout the province were made acquainted with the necessary hygienic measures and "washing stations" were placed at the doors of infected houses; a "washing station" consisted of a supply of soap and of potassium permanganate solution (1 gm. to 10 litres) in an empty petrol tin fitted with a bamboo spigot, and was so inexpensive that they could be provided in great numbers and were kept before the houses eight days after the death or recovery of the cholera cases. The method was considered efficacious in that the epidemic, though not checked altogether, was considerably milder than in previous years. It was observed that no two consecutive cases occurred in a house where a washing station had been established, nor in such a house had burial ceremonies led to a spread of the disease. In the military barracks, prison and hospital good results followed this precautionary measure, while on the other hand in the hospital for incurables, where the instructions were neglected, a series of cases developed.

H. S.

**DETRE (Ladislaus).** *Ueber die Bekämpfung der Choleraepidemie in provisorischen Kriegsgefangenenlager zu K.-S.* [Measures taken against a Cholera Epidemic in Temporary Prisoners' Barracks in K.-S.]—*Wien. Klin. Woch.* 1915. Oct. 7. Vol. 28. No. 40. p. 1097.

The most important feature was the questioning of the prisoners as to the number of stools passed on the previous day and the segregation of those who had had more than one. Of the 4,000 prisoners in the camp 91 had had two stools and 27 had had three or more. In 36 hours bacteriological examination proved the presence of *V. cholerae* in 5·8 per cent. of the 91 men and in 44·4 per cent. of the 27 men. Of these 17 infected persons five subsequently developed cholera. No further cases occurred in the camp after the segregation of the suspected. The epidemic broke out on the 16th June; segregation took place on 26th June. Twenty-three cases occurred in all with a mortality of 65·2 per cent.

H. S.

**FAICHNIE (N.).** *Gastric Juice and the Prevention of Enteric Fever and Cholera.*—*Jl. R. Army Med. Corps.* 1915. Sept. Vol. 25. No. 3. pp. 351-353.

A plea for the recognition of stomach acidity as a bar to cholera infection, with the natural corollaries that liquids which are bacteriologically suspicious should not be drunk on an empty stomach, but in small quantities after meals, so that the sterilising effect of the

hydrochloric acid may act for as long as possible and that liquids which are above suspicion should be drunk before meals, so that the stomach acidity may not be lowered by dilution during the digestion of possibly contaminated food.

H. S.

GELARIE (A. J.). **Vitality of the Cholera Vibrio in the Water of New York Bay.**—*Med. Record.* 1916. Feb. 5. Vol. 89. No. 6. Whole No. 2361. pp. 236-239.

To help decide whether the possible throwing of cholera carrier stools into the harbour of New York would constitute a danger to that city, the author undertook experiments on the viability of various cholera strains in New York bay and other waters, sterilised and unsterilised. The waters were infected with agar grown cultures and plates made from time to time to establish the presence or absence of *V. cholerae*, the water, 200 cc. in amount, being kept at room temperature and in the dark. The following table gives a summary of the results :—

TABLE VII.—Comparative Viability of Various Strains.

Strain.	Nature of the Water.	Number of Vibrios. added.	Period of time they lived.
Laboratory strain	Sterile bay water	149,500	154 days
A .. .. .	Native bay water	149,500	21 days
	Sterile tap water, Staten Island.	149,500	18 days
	Native tap water, Staten Island.	149,500	3 days
B .. .. .	Sterile bay water	4,000,000	285 days, still living.
Museum Natural History ..	Native bay water	4,000,000	7 days
	Sterile ocean water	4,000,000	285 days, still living.
	Native ocean water	4,000,000	7 days
	Sterile tap water, Brooklyn.	4,000,000	1 day
	Native tap water, Brooklyn.	4,000,000	1 day
Egypt .. ..	Sterile bay water	60,000,000	190 days, still living.
	Native bay water		47 days

In one case sterilized bay water, low tide, was inoculated with 160 million *B. coli* and 4 million *V. cholerae* together. *B. coli* died in three days; *V. cholerae* was alive at the end of 285.

H. S.

**GIOSEFFI (M.).** *Se e como un mercato possa essere o divenire centro o veicolo d'infezione colerica.* [Markets as Centres of Cholera Infection.]—*Gaz. d. Osp. e. d. Clin.* 1915. Sept. 29. Vol. 36. No. 66. pp. 1026–1029.

On examination of some 19 cases of a small epidemic in Trieste, it was seen that in a relatively short space of time the cases occurred in the most scattered quarters of the town. Neither the water nor the milk supply, neither the railway nor the port traffic could be held responsible for the outbreak; the cases could not be brought into direct relationship with one another or with cases occurring elsewhere; it was possible however to trace to some extent a course of infection to a canalside market place where vegetables were sold and where the author felt justified in surmising a carrier or carriers must have been the centre of infection.

H. S.

**ROGERS (Leonard) & SHORTEN (A. J.).** *The Alkalinity of the Blood in Kala Azar and Cholera, and the Technique of its Estimation.*—*Indian Jl. Med. Res.* 1915. Apr. Vol. 2. No. 4. pp. 867–881.

The work was undertaken by the authors to determine the extent in various cases of cholera of the acidosis which is regarded as the chief factor in the development of choleraic uraemia, and to decide as to the need of alkaline injections and the time of their administration.

WRIGHT's titration method was used for the determination of the alkalinity of the serum, it being argued that although in many ways the electrical estimation may be superior, it is much too complicated for a necessarily large series of cases, and that anyhow a deviation from the normal as recorded by the titration method must denote a very considerable alteration in the chemical constitution of the blood. Only 20 cases of cholera had been examined before the research was interrupted by the war; they are fully recorded in the table.

A diminished alkalinity of the serum is here seen to be a constant occurrence in all cholera cases and is very marked in those which were uraemic and fatal. No case whose alkalinity sank below  $\frac{N}{80}$  recovered.

It would seem that unless the sodium bicarbonate injections be administered early and before the alkalinity has sunk too low one may not expect recovery. Any cases coming for treatment late and with suppression of urine should be given alkali at once. If the specific gravity of the blood is low the authors recommend giving the 2–3 per cent. sodium bicarbonate solution per rectum or subcutaneously; if the specific gravity is high or almost normal, intravenously with subsequent rectal injections.

H. S.

**ROGERS (Leonard).** *The Further Reduction of the Mortality of Cholera to 11 per cent. by the Addition of Atropine Hypodermically to the Hypertonic and Permanganate Treatment with an Addendum summarising the System of Treatment.*—*Indian Med. Gaz.* 1916 Jan. Vol. 51. No. 1. pp. 7–11.

The author follows up his first report [this *Bulletin*, Vol. 6, pp. 484–489] on the use of atropine in cholera by a second one, being now



ROGERS (L.) & SHORTEN (A. J.). *Indian Jl. Med. Res.*  
 TABLE III.—Alkalinity of Blood in Cholera.

Number.	Age.	Duration before admission.	Specific Gravity of Blood.	Blood pressure in millimetres.	Number of Transfusions.	Pints of 2% Sodium Bicarbonate injected.	Alkalinity before Transfusion.	Alkalinity after Transfusion.	Days.	2	3	4	5	6	7	Progress of Blood Pressure.	Result.	Remarks.
1	30	7 hours	1053	75	..	..	..	..	18	N/40 56	N/45 Free	..	..	..	..	102	Rec.	Mild.
2	40	4½	1052	95	..	..	..	..	N/40 4	N/40 Free	..	..	..	..	..	100	..	..
3	17	6½	1063	0	1	..	N/50 60	N/45 60	48	33	48	..	..	..	..	85	..	Typical Collapse.
4	12	9	1059	0	1	..	..	..	12	N/70 2½ 32	Free	Free	N/45 Free	..	..	75-100	..	..
5	40	7	1058	75	1	..	..	..	0	N/60 72	Free	..	..	..	..	102	..	..
6	32	24	1060	0	1	..	N/45 50	N/45 50	16	62	N/60 Free	..	..	..	..	90	..	..
7	18	5	1062	0	1	Per Rectum.	N/60 75	N/45 60	6	N/45 +12 25	Free	..	..	..	..	95	..	..
8	55	65	1056	80	1	2. I.V.	N/65 35	N/35 6½ 42	*	N/35 6½ 42	67	..	..	..	..	87	..	..
9	32	9	1056	78	1	2. I.V.	N/60 32½	N/60 32½	*	24	42	..	..	..	..	75-100	..	..
10	40	26	1065	85	..	1. I.V.	N/52½ 62½	N/52½ 62½	11	36	*	46	..	..	..	100-110	..	..
11	23	10	1067	30	3	..	..	..	37	N/60 36	37	N/50 +24	..	..	..	92-108	..	..
12	24	4½	1057	73	3	..	..	..	N/45 34	48	18½	Free	..	..	..	85-92	..	..
13	40	28	1066	40	2	3. I.V.	..	..	0	36	24	N/80* 13½	2½ 21	66	N/60 Free	102-125	..	..
Cases ending fatally:—																		
14	40	8 hours	1064	30	2	..	..	..	0	N/80 0	..	..	..	..	..	30-80	Died	Collapse.
15	65	4	1061	0	4	..	..	..	0	N/160 0	..	..	..	..	..	0-70	..	..
16	30	19½	1067	0	3	1. I.V. (3%)	..	..	1	5	N/100* 0	0	0	N/90 0	..	55-85	..	Uraemia.
17	31	22	1064	0	4	1. I.V.	..	..	4½	N/80 8	* 14	21	N/80 24	44	N/50 Free	30-95	..	Sloughing B-d Scar.
18	30	22	..	..	1	1 Subcutaneous	..	..	44	6	1	0	0	N/120 8	8 days N/45 Free	80-100	..	Gargantuan Bullet Wound.
19	50	32	1048	80	..	1 Subcutaneous	..	..	5	7	17	N/120 6	N/120 40	N/80 0	N/30 N/55 0	90-150	..	..
20	30	6 days	1054	110	1	1. I.V.	..	..	0	N/240 0	N/120 0	..	..	..	..	110-125	..	Late admission.

I.V.—Intravenous Injection. \*Days' Alkaline Injections given.





able to compare 100 cases so treated with 100 unselected and alternative untreated ones; the time taken in collecting the cases was about a year and so included all the seasons with their corresponding mortalities.

The severity of the cases in the two groups was compared by tabulating them and proved to be about equal. Pulseless cases and those with blood of very high Sp. gr. (over 1,065) were found to be represented fairly evenly in the two groups and their ages were nearly equal; the mortality however when atropine was included in the therapy was 11 per cent. as against 22 per cent. when it was not.

Collapse, uraemia and pneumonia are the causes of death against which the remedy appears chiefly to work, as shown by Table III.

TABLE III.

The causes of death in the two series of cases.

	Collapse.	Uraemia.	Pneumonia.	Other causes.	TOTAL.
Atropine ..	3	4	1	3	11
No Atropine ..	9	5	6	3	23

The blood pressures in the group treated with atropine were higher than those in the one without; the respirations were diminished—both good prognostic signs.

TABLE IV.

Blood pressure on the day after admission.

Blood pressure.	ATROPINE.			NO ATROPINE.		
	Cured.	Died.	Total.	Cured.	Died.	Total.
To 70 mm. ..	2	2	4	2	4	6
71- 80 mm. ..	4	2	6	9	1	10
81- 90 mm. ..	21	5	26	22	4	26
91-100 mm. ..	35	0	35	22	3	25
101-110 mm. ..	19	0	19	11	0	11
111-120 mm. ..	6	0	6	7	2	9
Over 120 mm. ..	1	0	1	3	1	4
Total ..	88	9	97	76	15	91

54 (55.7%)

34 (37.3%)

TABLE V.

Respiration rates on day after admission.

Rates per minute.	ATROPINE.			NO ATROPINE.		
	Cured.	Died.	Total.	Cured.	Died.	Total.
To 20 ..	6	0	6	3	0	3
21 to 25 ..	52	2	54	39	5	44
26 to 30 ..	29	2	31	29	5	34
31 to 40 ..	1	4	5	7	2	9
Over 40 ..	1*	1	2	0	3	3
Total ..	89	9	98	78	15	93

\* 11 given in the original; no doubt a misprint.

The pulse rate did not appear to be materially altered by the giving of atropine, nor was the vomiting reduced. The author, however, does not find vomiting frequent or of importance when hypertonics are injected and permanganate administered. A somewhat greater flow of urine, no doubt due to the higher blood pressure, is noted to result from the use of atropine.

A very useful, complete and concise summary of the author's method then follows.

H. S.

SINTON (J. A.). **Results of the Treatment of 69 Cases of Cholera by Rogers' Method.**—*Indian Med. Gaz.* 1915. Aug. Vol. 50. No. 8. pp. 281-286.

At Kohat, North-west Frontier Province, during August and September of 1914, a series of severe and unselected cases, 38 in number, was treated according to ROGERS with hypertonic injections, permanganate pills and such drugs as adrenaline, pituitrin and strychnine to combat collapse and suppression of urine, together with cuppings over the kidneys and hot fomentations. The mortality amongst these severe but treated cases was 37 per cent. as compared with a mortality of 83·4 per cent. amongst all the untreated during the same period. A quicker and easier method of giving an intravenous injection than the one of using a needle and inserting it directly into a vein is said by the author to be that of making a  $\frac{1}{2}$ — $\frac{3}{4}$  inch incision alongside the vein and, after dissecting this out, of thrusting a pair of forceps, edges uppermost, underneath to serve as a means of compression for the vein above and below the point of insertion of the canula, and at the same time to lift the vein up out of the wound and render it accessible.

H. S.

**VALK (Wilh.) Enkele aantekeningen over de cholera-patienten behandeld in het Stadsverband te Batavia 1914.** [Some Notes on Cholera Patients treated in the Batavia District during 1914.]-*Geneesk. Tijdschr. v. Ned. Ind.* 1915. Vol. 55. No. 5. pp. 561-566.

A short account of the application of the usual therapy in some 115 cases of cholera. An urticarial erythema was observed in eight of the cholera patients but also in other cases treated with hypertonic saline injections and not diagnosed bacteriologically as cholera even after repeated examination. A case with cholecystitis necessitating the opening of the gall bladder is described. *V. cholerae* was obtained from the bile in pure culture and did not disappear from the secretion till between the 4th and 8th week after operation. The stools remained free from the comma bacillus.

H. S.

**STRAUSS (H.). Zuckerinfusionen bei Cholera.** [Saccharine Injections in Cholera.]-*Therap. d. Gegenwart.* 1915. Oct. Vol. 56. No. 10. pp. 370-373. With 2 text-figs.

As sodium chloride in large quantities does harm to already damaged kidney epithelium, and as glucose has been shown by KAUSCH, who for nutritive purposes gave 5-10 per cent. glucose solution in amounts of 1,000 cc. once or twice a day, to be well borne when injected intravenously, the author advises the use of glucose isotonic ( $4\frac{1}{2}$  per cent.) injections in cholera. Hypertonic glucose solution would, he thinks, have only a temporary influence, the sugar being soon removed by the tissues. He hopes that under this treatment the renal conditions may show improvement, which according to RUMPF and others they did not do when saline injections were used.

H. S.

**PETROVITCH. Sur les bons effets de la bactériothérapie spécifique dans le choléra au cours de la Campagne de Serbie (1914).**-*Bull. Acad. Med.* 1915. Aug. 10. Vol. 74. No. 32. pp. 185-188.

A short account of treatment tested in Serbia in August 1914. Slight cases (1,153) were given small doses of cholera vaccine daily till the diarrhoea ceased (generally on the 2nd-16th day).

Medium cases (90) received the cholera vaccine in quantities of normal serum from 10-100 cc. intravenously, sometimes as often as twice or thrice a day.

Severe cases (157) were treated like the medium ones but received the vaccine in 500 cc. saline solution. The author decides that the administration of cholera vaccine was beneficial, the 90 medium cases all recovering while 95 similar ones under ordinary treatment showed a mortality of 9.4 per cent., and the 157 severe cases having a mortality of 14.4 per cent. against one of 58 per cent. for 120 severe cases not given vaccine treatment. [The conclusions are unconvincing owing to a lack of detailed information.]

H. S.

CASTELLANI (Aldo) & MENDELSON (Ralph W.). **Note on the Tetravaccine: Typhoid + Paratyphoid A + Paratyphoid B + Cholera.**—*Brit. Med. Jl.* 1915. Nov. 13. pp. 711-713.

The special feature of this mixed vaccine is that the 0.5 per cent. phenol, present here as in most vaccines, is relied upon to effect the killing of the organisms, no heating of the vaccine taking place at all. The cultures were usually grown on agar but occasionally peptone water was used. The 0.5 per cent. phenol was found to sterilise within a few hours at 10°-20° C. The dosage was, particularly for *V. cholerae*, a smaller one than usual, as the vaccine was mixed so as to give :—

Typhoid .. .. .	500 million per cc.
Paratyphoid A .. .. .	250   "   "
Paratyphoid B .. .. .	250   "   "
Cholera .. .. .	1000   "   "

and of this 0.5 to 0.6 cc. was given as a first dose and repeated at intervals of a week as a second and possible third dose.

Three individuals inoculated with this vaccine gave the following agglutination results (see table, p. 257).

These titres are declared to be practically identical with those obtained in control persons inoculated with corresponding single vaccines.

H. S.

SCHMITZ (K. E. F.). **Ueber einzeitige Immunisierung mit Typhus- und Cholera-Impfstoff (Mischimpfstoff).** [Immunisation with a Mixed Typhoid and Cholera Vaccine.]—*Berlin. Klin. Woch.* 1915. May 31. Vol. 52. No. 22. pp. 572-574.

Using a vaccine containing  $\frac{1}{2}$  loop typhoid culture and 2 loops cholera culture per cc., the author inoculated three men and two women as follows :—The men received 0.8, 1.6 and 2.0 cc., the women 0.7, 1.4 and 1.8 cc., one week elapsing always between the inoculations; the reaction was of the mildest. None of the persons had had typhoid or cholera previously and no one's serum contained typhoid or cholera agglutinins before inoculation. In 3-5 weeks after the third inoculation the typhoid and cholera titres reached in every case between 1/10,000 and 1/20,000.

Nine soldiers inoculated elsewhere against cholera and typhoid with *other* vaccines and *separately* were examined for comparison; when tested at periods varying from three weeks to three months subsequent to inoculation they could show no titre for cholera higher than 1/800 and for typhoid than 1/1000.

The author considers the greatly superior results obtained by him to be due probably to the fact that the strains used were better ones for immunising purposes or (less probably) to a greater stimulation to antibody production resulting when two bacteria are inoculated simultaneously; this latter alternative received some support when it was seen that two persons inoculated with the author's typhoid vaccine only showed typhoid titres of merely 1/800 and 1/3000 three weeks after the third inoculation.

It should be mentioned that agglutination was carried out in all cases with a strain other than the one used for inoculation. It was

[CASTELLANI (A.) &amp; MENDELSON (R. W.).]

Blood Examination of Three Persons inoculated with the Tetravaccine (two inoculations:  
 $\frac{1}{2}$  cc. first,  $\frac{1}{2}$  cc. second).

Individuals Inoculated.	Blood tested against	Limits of Agglutination. Weeks after first Inoculation.					
		1	2	3	4	5	6
No. 1 .. {	<i>B. typhosus</i> ..	1/20	1/1200	1/400	1/300	1/151	1/150
	<i>B. paratyphosus A</i> ..	1/20	1/300	1/200	1/150	1/100	1/60
	<i>B. paratyphosus B</i> ..	1/20	1/200	1/200	1/200	1/150	1/80
	<i>V. cholerae</i> ..	1/10	1/100	1/100	1/80	1/80	1/60
No. 2 .. {	<i>B. typhosus</i> ..	1/40	1/800	1/300	—	1/200	1/100
	<i>B. paratyphosus A</i> ..	1/20	1/200	1/150	—	1/100	1/100
	<i>B. paratyphosus B</i> ..	1/20	1/150	1/100	—	1/80	1/60
	<i>V. cholerae</i> ..	1/20	1/40	1/40	—	1/20	1/20
No. 3 .. {	<i>B. typhosus</i> ..	1/40	1/1000	1/4000	1/200	1/100	1/80
	<i>B. paratyphosus A</i> ..	1/20	1/250	1/200	1/150	1/80	1/60
	<i>B. paratyphosus B</i> ..	1/10	1/200	1/150	1/150	1/100	1/60
	<i>V. cholerae</i> ..	1/10	1/100	1/40	1/20	1/20	1/20

noticed that of the five persons inoculated with typhoid and cholera simultaneously, the two who had had paratyphoid B fever six and seven years previously, starting with paratyphoid B titres of 1/100 and 1/50, developed ones of 1/5000 and 1/1000. The remaining three persons, who had not had paratyphoid fever, did not agglutinate *B. paratyphosus* B before inoculation and did so only in titres of 1/30, 1/100 and 1/500 after inoculation.

H. S.

VON LIEBERMANN (L.) & ACÉL (D.). *Simultanimpfungen gegen Typhus und Cholera*. [Mixed Cholera and Typhoid Vaccines.]—*Deut. Med. Woch.* 1915. Oct. 14. Vol. 41. No. 42. p. 1243.

As an explanation of the tables which give the results of work done to establish the validity of mixed cholera and typhoid vaccines, it is necessary to add that the inoculations were subcutaneous and given on three successive days, the dosage for typhoid being 0·5, 1·0 and 2·0 loops respectively, for cholera 0·6, 1·2 and 2·4 loops, for typhoid+cholera the same quantities given together. The bactericidal titre was established according to STERN and KORTE and was the smallest quantity of serum which in 1 cc. of physiological saline containing 0·1 cc. of an emulsion of the organism in question and a certain quantity of complement, markedly lowers the numbers of bacteria which grow on plating, as compared with control plates (see page 259). [The uniformity of the figures given in the tables is surprising, to say the least of it.]

BUJWID (Odo). *Die Erzeugung der Impfstoffe und Massenimpfungen in Krakau gegen Cholera und Typhus in der Zeit des Krieges 1914-15*. [The Preparation and Inoculation of Typhoid and Cholera Vaccines in Cracow during 1914-15.]—*Med. Klinik*. 1915. Dec. 26. Vol. 11. No. 52. pp. 1421-1423. With 1 fig.

A method of standardising vaccines more efficiently than counting is described. [No comparative details given.] It consists in weighing a culture before and after removing a small amount (5-12 mg.) on a fine glass rod. This small amount is then emulsified in 10 cc. saline; the remainder of the agar slope culture is emulsified also and a sample taken up in a graduated 1 cc. pipette and dropped into 10 cc. fresh saline till the opacity produced equals that of the weighed and already emulsified portion. A knowledge of this weight and of the various quantities employed allows of the strength of the emulsion prepared from the agar slope being worked out in terms of milligrams. The author kills both cholera and typhoid vaccine with ·5 per cent. phenol and employs no heat at all. His first dose for cholera is 2 mg., double that being given five days later. The reaction was unimportant, only in 3-5 per cent. did diarrhoea and more seldom still vomiting occur. The author considers the prophylactic cholera inoculation to have been very effective. The mortality among the uninoculated cases was 40-50 per cent., while of the 63 inoculated cases four (6·3 per cent.) died and these four had been inoculated only once. In Cracow itself no cases occurred among the civil population.

H. S.

Agglutination and Bactericidal Titre with *B. typhosus*. [von LIEBERMANN (L.) & ACÉL (D.).]

Serum of Rabbits Inoculated with :—	Agglutination-titre.			Bactericidal titre.		
	Before Inoculation.	7 days after Inoculation.	28 days after Inoculation.	Before Inoculation.	7 days after Inoculation.	28 days after Inoculation.
<i>B. typhosus</i> .. .. .	..	1 : 4000	1 : 8000	0·001	0·0000001	0·000001
" .. .. .	..	1 : 4000	1 : 8000	0·001	0·0000001	0·000001
" .. .. .	..	1 : 4000	1 : 8000	0·001	0·0000001	0·000001
<i>B. typhosus</i> + <i>V. cholerae</i> .. .. .	..	1 : 4000	1 : 8000	0·001	0·0000001	0·000001
" .. .. .	..	1 : 4000	1 : 8000	0·001	0·0000001	0·000001
" .. .. .	..	1 : 4000	1 : 8000	0·001	0·0000001	0·000001

Agglutination and Bactericidal Titre with *V. cholerae*.

Serum of Rabbits Inoculated with :—	Agglutination-titre.			Bactericidal titre.		
	Before Inoculation.	7 days after Inoculation.	28 days after Inoculation.	Before Inoculation.	7 days after Inoculation.	28 days after Inoculation.
<i>V. cholerae</i> .. .. .	..	1 : 2000	1 : 4000	0·01	} vibrios were killed by the sera in every dilution.	
" .. .. .	..	1 : 2000	1 : 4000	0·01		
" .. .. .	..	1 : 2000	1 : 4000	0·01		
<i>B. typhosus</i> + <i>V. cholerae</i> .. .. .	..	1 : 2000	1 : 4000	0·01		
" .. .. .	..	1 : 2000	1 : 4000	0·01		

SEIFFERT (G.). **Kombinierte Schutzimpfung gegen Typhus und Cholera.** [Simultaneous Inoculation for Typhoid and Cholera.]—*München. Med. Woch.* 1915. Nov. 23. Vol. 62. No. 47. pp. 1617–1619.

A combined typhoid and cholera vaccine was given to some 250 men. No complications. Reactions not more pronounced than when single vaccines were inoculated.

Twenty-five sera were examined before and at various stages after the giving of the vaccine for the presence of agglutinins, bacteriolysins, bacteriotropines, complement-fixing and growth-inhibiting bodies. In every case it was seen that the mixed vaccine had given the same result as if typhoid and cholera vaccines had been given separately. [That is to say qualitatively; no control experiments were carried out to give an idea of the quantitative relationship.] The growth-inhibiting bodies referred to were found by the author to exist in normal sera, but to disappear specifically from the sera of convalescents and inoculated; the test is carried out by inoculating 0.5 cc. inactivated serum before and after inoculation with the organism in question, incubating for 12 hours at 37° and sowing a loopful in agar plates to determine whether inhibition has taken place or not.

H. S.

VON WASSERMANN (A.) & SOMMERFELD (R.). **Experimentelle Untersuchungen über die Wirksamkeit der Typhus- und Cholereschutzimpfung.** [An Experimental Study of the Efficacy of Typhoid and Cholera Inoculation.]—*Med. Klinik.* 1915. Nov. 28. No. 48. pp. 1307–1310.

Taking into consideration that cholera as a disease originates in the intestinal epithelium, subcutaneous and intravenous inoculation not causing cholera as such, the authors wondered if prophylactic inoculation confers its immunity by reason of the resulting increase of anti-bodies in the blood. The idea in their experiments was to take animals which could not be infected with cholera organisms administered per os and see if the lowering of the general resistance by starvation and the removal of the anti-bodies pre-existent in the blood by the injection of *B. Danyz* would render the animals liable to invasion by *V. cholerae* given per os. Mice were starved for 24–48 hours before being inoculated subcutaneously with living *B. Danyz*, starvation being continued until the animals showed signs of illness when cholera vibrios were given by means of a stomach tube. On killing the following day cholera vibrios were found in the heart blood and various organs. Controls in which cholera organisms were put into the stomach without other treatment showed no vibrio infection. Similar results were obtained with *B. typhosus*; here however in place of a *B. Danyz* inoculation extract of typhoid bacilli was injected to remove anti-bodies from the blood. The authors claim to have proved that the resistance of the intestinal epithelium of mice to infection by cholera and typhoid bacteria is connected with the presence of anti-bodies in the blood.

[Controls establishing the effect of starvation alone on the lowering of resistance to infection and experimental evidence of a depletion of anti-bodies as a result of the preparatory treatment are not recorded.]

H. S.



## MALARIA.

**PUNJAB. Report on Malaria in the Punjab during the Year 1914, together with an Account of the Work of the Punjab Malaria Bureau.** By Lieut.-Col. D. T. LANE, I.M.S., Chief Malaria Medical Officer, Punjab.—3 pp. With 3 maps and 3 charts. 1915. Lahore: Printed by the Superintendent, Govt. Printing, Punjab. [Price Rs.1-5-0. or 2s.]

This brief report is illustrated with three excellent maps and three charts, besides the necessary mortality-table.

The principal item of the text is a summary of a malaria-survey of Lahore, from which it is concluded that protection from malaria would not there be difficult or expensive. In Lahore—as indeed in the plains of India generally—water tends to stagnate alongside the lines of embankment of roads and railways. “There is a chain of pools along the sides of practically all the roads approaching Lahore.” In one particular line of pools *Anopheles* larvae were found all the year round. The Chief Malaria Officer thinks all this foul and pestilent congregation of vapours might be made to blossom like the rose. “A rose-garden along the railways from Lahore to Mian Mir would probably return a handsome profit.”

In rural districts *dák*-bungalows and rest-houses are considered to be nurseries of malaria, as the men in charge of them know nothing about extirpating the breeding-places of mosquitoes.

The prevention of malaria in the new canal-colonies of the Punjab is referred to, but no exact observations are here placed on record.

The need for inter-departmental co-operation is illustrated by the statement that in one important town the excellent practice of immunising school children by quinine was invalidated by the fact that for about half the malaria season the schools were closed for the holidays.

A table and a chart show that the total number of deaths from “fever” in the Punjab in 1914 was 345,471, or 17·86 per 1,000 of the population, and that the months of higher mortality were September to January, with a maximum in October, and those of lower mortality February to April, with a minimum in April; July and August were also below the mean of all months.

A map illustrating the local rates of mortality from “fever” shows that the worst districts are generally those to the west of the province, between the Indus and Jhelum, and those to the extreme east, between the Jumna and the Ghaggar (which dies in the Bikanir Desert); while the least fatal—leaving the exceptionally-situated Simla district out of the account—are the districts of Ferozepore and Ludhiana, which lie between the basins of the Indus-system and the Ganges-system. The worst districts of all are Muzaffargarh (25·45 deaths per thousand of the population) which is impacted between the Indus and the Jhelum-Sutlej, and Karnal (23·7 per 1,000) which is situated between the Ghaggar and Jumna.

The two maps showing the local spleen-indices of school children in July and November, respectively, when compared with the map of local rates of mortality from “fever,” though they exhibit a general concordance between the degree of spleen-affection and the degree of fever-mortality, yet reveal some remarkable incongruities, which may,

perhaps, be worth investigating. For instance, in the district of Lyallpur, where the death-rate from fever is one of the lowest, the spleen-index is one of the very highest, and a similar though not so strongly-contrasted, relation between the two phenomena appears in the contiguous districts to the north and the south.

The two charts showing the mortality year by year (1) from all causes and (2) from "fever" from 1867 to 1914 would, for syllogistic purposes, have been more useful if the annual deaths in each case could have been reduced to a common ratio. However, taking no more than is set down for them, the figures show—and it cannot but make the judicious grieve—that every year from 1867 to 1900, when plague began to compete, more people died of "fever" in the Punjab than of all other diseases put together. The charts also show that in certain years, notably 1878–79, 1890, 1892, 1900, 1908, there was a sudden and enormous increase in the number of deaths from "fever." *Ex ungue leonem*—much of the evidence from the Punjab might be extended to the plains of India generally.

A. Alcock.

STRICKLAND (C.). **Certain Observations in the Epidemiology of Malarial Fever in the Malay Peninsula.—Federated Malay States.** No. 15 of 1915. Paper to be laid before the Federal Council by Command of H. E. the High Commissioner.

The author of this memorandum, revolving—it may reasonably be supposed—in his doubtful mind the sayings of Herodotus concerning the mutability of human affairs and the jealousy of the powers above, has decided to make public a hypothesis which he thinks can be verified though he admits that it lacks proof. It is that in the hills of the Malay Peninsula land that has been opened up for plantation and settlement becomes malarious if the ravines and valleys are cleared, but is not malarious if the ravines and valleys are left in their natural virgin state.

The hypothesis is countenanced by some epidemiological observations that certainly are suggestive, and by some entomological investigations which in the present state of the hypothesis are even more impressive.

The epidemiological evidence, which is entirely empirical, is as follows:—

(a) Along 140 miles of a hill road there are, at intervals of a few miles, cooly-lines which in every case are surrounded by forest; a jungle stream runs in front of one of the lines. The coolies in these lines say that they never have had fever.

At one spot, along this stretch of road, where a large plantation has been opened up the coolies "were suffering considerably from fever."

(b) Kuala Lipis is a settlement where the European quarters are for the most part situated at the head of ravines that are densely overgrown with jungle. This settlement is generally considered to be so free from malaria that most Europeans discard mosquito-nets there.

(c) Kuala Lumpur is said by old inhabitants to have been healthy until the jungle in the ravines was cut down.

(d) On a certain estate "the health had been excellent" up to a time when all the ravines were cleared. Now the medical officer of the estate has ordered compulsory quinine.

According to the author's entomological observations no notorious malaria-carrying species of *Anopheles* exist in the swamps of ravines that are covered with virgin forest. The only species at all common in such situations is *Anopheles aitkeni*, which has never been known to enter houses or to leave the jungle at all.

On the other hand where such ravine swamps have been exposed by clearings for roads or settlements, then it is common to find *sinensis*, *albirostris*, *maculatus*, *karwari*, *fuliginosus*, *rossi*, and *kochi*, some of which are notorious as carriers of malaria.

The author is anxious that his hypothesis should be submitted to processes of exact proof, some part of which would be furnished by adopting his recommendations (a) that in opening up hill country the ravines should be left in their natural state right up to, and a few feet beyond, the crests of their slopes, and (b) that ravines where they have already been cleared should be allowed to revert to nature, or should be afforested by experts.

A. A.

STRICKLAND (C.). **Considerations regarding an Outbreak of Malaria at Morib, Federated Malay States.**—*Parasitology*. 1916. Jan. Vol. 8. No. 3. pp. 249-254.

The outbreak occurred at a seaside resort for Europeans, and the author had first to satisfy himself by an examination inclusive of all the elements of the local population, that malaria is there endemic. The local *Anopheles* mosquitoes were next collected, and were found to consist of five species, namely *ludlowi*, *rossi*, *umbrosus*, *sinensis*, and *tessellatus*, the first on the list being more than three times as numerous as all the others put together in a nine days' collection, and the two last being represented by one specimen of each. No evidence of infection was found in any of the specimens (80, 38, 13, 1, 1 respectively) investigated to that end, and in the absence of any such direct evidence the author concludes that most of the malaria at Morib must be attributed to *ludlowi*, as being by far the most abundant of the three out of the five species (the other two being *umbrosus* and *sinensis*) that have been proved to be carriers elsewhere in the Oriental region.

A. A.

MORRIS (Leslie M.). **Malaria in H.M. Ships "Hermione" and "Bristol" at Tampico, with Special Reference to Methods of Screening.**—*Jl. R. Naval Med. Service*. 1916. Jan. Vol. 2. No. 1. pp. 42-50. With a sketch map.

This paper gives *inter alia* an interesting account of measures taken to keep mosquitoes out of ships lying in a riverside port with malarial surroundings and in propinquity to a native quarter said to be "indescribably primitive." *Anopheles* swarmed. It was easy to make gun-ports, skylights, and ventilation-openings mosquito proof, but the screening of hatches presented difficulties, which were overcome

to some extent by fitting the screens with falling doors closing automatically by weights. The intakes to the fans were covered by a screen which was found to act as a mosquito-trap. Screening of course, particularly muslin, interfered with ventilation, and netting did not stand prolonged exposure to rain; in all respects wire-gauze is said to be preferable. Daily inspections were made to see that all screens were in repair and were in position before sunset. The ship was kept as dry as possible, so as to offer no encouragement to mosquitoes breeding, and was searched for mosquitoes every day. Officers were advised to use mosquito-nets; men had to sleep below, and were instructed to wear boots and keep trousers tucked inside socks after evening quarters.

For further protection quinine was issued in five-grain doses daily, and the intelligent and self-interested co-operation of the ships' company was enlisted by rational instruction.

Notwithstanding all these precautions, two separate outbreaks of malaria—benign tertian and subtertian, in the proportion of 4 to 1—occurred in the "Hermione," the number of cases being 51 and 55 respectively, in a ships' company of 325. Mosquito-nets were provided for the infected men, who were further isolated in a part of the ship which was fitted with extra screens to all openings and communications.

As a result of the experience gained in the "Hermione," the "Bristol," which relieved the former ship from England, had been adequately fitted with screens of copper-gauze in Portsmouth dockyard. Furthermore in the "Bristol" the preventive dose of quinine was increased every alternate evening by 5 grains; all men not on duty were required to be below, and behind screens, by 6 p.m.; the deck watch and signalmen wore helmets, veils, and gloves, and had their feet and ankles protected, and no lights were allowed on deck at night.

Notwithstanding, cases of malaria began on the 13th day after arrival, and altogether 95 cases occurred, in a ship's company of 375, in the course of about a month. The majority were youngsters straight from England, and the first infections were among ward-room domestics and cooks from the galleys on the upper deck.

In neither ship were any of the cases serious or complicated, a happy issue which is attributed to the regular quinine prophylaxis. Among the officers of the two ships there was only one case, this exemption being ascribed to the fact that the officers realized the value of mosquito-nets and quinine.

The author expresses the opinion that the moderate use of alcohol, after sunset, is auxiliary to preventive treatment.

[The effect of sea-air on the copper-gauze screens of the "Bristol" remains to be observed. In some tropical sea-ports metallic copper becomes corroded very quickly.]

A. A.

BAHRENBURG (L. P. H.). **Malarial Fever. Recent Appearance at Galveston, Tex. (From a Report.)—U. S. Public Health Rep.** 1915. Dec. 17. Vol. 30. No. 51. pp. 3657-3658.

It has been stated that there are no indigenous Anophelines in the island of Galveston, and it is also asserted on competent authority, that prior to a big storm in August 1915 malarial infection of local

(autogenous) origin was extremely rare if not actually unknown. The neighbouring Texas coast, however, has long had a bad reputation for malaria.

It is suggested that the occurrence of malarial fevers in Galveston subsequent to this storm—many people who had not been on the mainland being severely affected—may be ascribed directly to storm-carried mosquitoes from the infected mainland, and that the continuance of infections in October and November must be due to these storm-borne mosquitoes having found suitable breeding-places in the island, though none such had been thought to exist.

As an *a priori* argument the theory is rational and highly probable, but the confirmatory facts of observation, which would be so interesting are wanting. Indeed the statement that immediately after the storm there was "almost a total absence of mosquitoes" for a week or ten days or *even longer*, if it be a correct expression of the facts, points to the existence of some special factor, or factors, that need to be adjusted with the theory.

A. A.

MITZMAIN (M. Bruin). *Anopheles punctipennis* Say. Its Relation to the Transmission of Malaria.—Report of Experimental Data relative to Subtertian Malarial Fever.—*U. S. Public Health Rep.* 1916. Feb. 11. Vol. 31. No. 6. pp. 301-307.

*Anopheles punctipennis* being a species of wide range in the United States, its exact position in relation to malaria is a question of great importance. Mr. Mitzmain, whose high reputation as an experimental pathologist has been established in several fields, found (a) no infection of stomach or salivary glands in any of 219 individuals of this species dissected 3 to 38 days after repeated feeds on patients whose blood contained crescents, and (b) that no infection of healthy human beings followed repeated and copious bitings from individuals of this species that had sucked blood containing crescents 4 to 33 days before (except in the case of one volunteer who was also bitten accidentally by an infected *A. quadrimaculatus*).

Control experiments with *Anopheles quadrimaculatus* and *A. crucians* resulted in 13·8 per cent. and 33·3 per cent. of transmitted infections, respectively, from those two species.

One of the volunteers, who submitted to 91 bites from *A. punctipennis* seems to have been Mr. Mitzmain himself.

A. A.

BARRET (Harvey P.). Notes on the Breeding Places of *Anopheles*.—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1916, Jan. Vol. 3. No. 7. pp. 406-410.

In the course of a mosquito-survey of Charlotte (North Caroline) and its vicinity conducted in the spring and summer of 1915 the larvae of *Anopheles punctipennis* were found everywhere—in muddy puddles and in water-butts as well as in ditches, streamlets, and the grassy selva of large streams and creeks. No originality is claimed, for observations which are known to apply to several other species of *Anopheles* in other lands.

A. A.

**RIEGEL. Halbmondfieber (Malaria tropica), erworben in Nordpolen.**  
 [Malaria with Crescents acquired in North Poland.]—*München. Med. Woch.* 1915. Nov. 9. Vol. 62. No. 45. pp. 1534–1535.  
 With 2 text-figs.

The paper records the case of a man who contracted malaria with typical crescents (shown in microphotographs) in North Poland, north of latitude 54° near Kalwaria in July 1915. He had resided in this district for four months before infection took place and previous to his journey there in January he had never left his home in Schleswig-Holstein, where he had never suffered from malaria. There seems little doubt that the author's conclusion is correct that infection took place in the locality indicated.

C. M. Wenyon.

**SAINTON (Paul). Les formes légères et méconnues du paludisme.**—*Bull. Acad. Méd.* 1915. Dec. 7. Ann. 79. Vol. 74. No. 49. pp 700–703.

Remarks upon five cases from the army of France, in which malarial parasites were found in the blood, and which were cured at once by quinine, though the symptoms, so far from pointing to malaria, suggested gastro-enteritis, or even in one instance, dysentery. The men had been for a considerable time in the trenches, in a marshy part of Flanders, where mosquitoes were very abundant. Their homes were not situated in a malarial region, they had never been in the colonies, nor had they ever suffered from malarial fever before. Analogous cases, simulating gastro-enteritis but responsive to quinine, were afterwards noticed in the naval hospital at Cherbourg, though there the diagnosis of malaria was not confirmed by examination of the blood.

A. A.

**BASS (C. C.) & JOHNS (F. M.). A Method of Concentrating Malaria Plasmodia for Diagnostic and other Purposes.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1915. Nov. Vol. 3. No. 5. pp. 298–303.  
 With 4 plates.

After more than three years' experience the authors have elaborated a method of concentrating plasmodia to aid diagnosis, as well as to collect large quantities for experimental purposes. The method depends upon the fact that a malaria plasmodium with its host erythrocyte is larger than the non-parasitized erythrocyte and that when centrifuged at proper speed the large cells rise to the top of the cell column. Most of the leucocytes are still larger than the parasitized cells and accordingly rise to a higher level still. In a tube properly centrifuged there are the following layers: leucocytes and serum, parasitized erythrocytes, and non-parasitized erythrocytes. The older and larger the parasites the more certainly do they collect on the top. This is true of crescents and other gametocytes, and tertian and quartan schizonts which are more than half grown. They rise more quickly than other smaller parasites. Many of the smallest sizes do not rise at all though large ring forms rise promptly. By proper technique 90 per cent. of all the plasmodia (except the smallest rings) can be collected from 10 cc. of blood and all placed upon one or two slides in the form of ordinary blood smears.

*Technique.**Material required—*

"1. A solution of 50 grams sodium citrate and 50 grams dextrose in sufficient distilled water to make a volume of 100 cc. Solution is aided by heat. Filter.

*"Apparatus required:—*

"1. All glass syringe, capacity 10 cc.

"2. A 1 cc. pipette graduated in hundredths.

"3. Plain test tubes (centrifuge tubes) 1.5 cm. inside  $\times$  about 12 cm. Cornell centrifuge shields are necessary for these round bottom tubes. The conical centrifuge could be used.

"4. Plain test tubes 0.5 cm. inside  $\times$  about 12 cm. We make these out of suitable glass tubing.

"5. Capillary pipettes large size. Inside diameter of capillary should be about 0.1 cm. These are made of suitable glass tubing.

"6. Capillary pipettes small. Outside diameter of tube should be less than inside diameter of large capillaries. These are made of suitable glass tubing.

"7. Rubber nipple.

"8. Glass cutting knife (or file).

"9. Electric centrifuge having a speed of 2,000 or more revolutions per minute."

*Method.*

Into a large tube measure 0.2 cc. of the citrate dextrose solution. Draw 10 cc. of blood with the syringe from a vein and put into the citrate dextrose solution at once and mix. Place equal quantities of this mixture in the large centrifuge tubes to depth of 2-5 cm. Centrifuge the tubes for the proper length of time. This varies for each centrifuge and can only be determined by experience. The authors' centrifuge ran at speed of 2,500 revolutions per minute and the distance from the centre to the end of tube was 18 cm. The proper length of time on the authors' machine is one minute for each cm. of blood in the tube. If the depth is  $3\frac{1}{2}$  cm. the time is  $3\frac{1}{2}$  minutes. All the plasmodia and the leucocytes rise to the top of the cell sediment and are in the first 0.1 cm. With a large pipette skim off as much of this layer as possible and place in one (or two) of the 0.5 cm. tubes. The contents must be properly mixed by drawing in and out of the pipette. The column in this tube must not be more than 5 cm. deep. Centrifuge as before. With large capillary tube draw not more than 5 cm. column of the cells into it from the surface of the cell column. It is a good plan to mix this well by forcing it in and out of the pipette on to a slide. Draw it into the pipette past the tip and seal in the flame. Cut off the capillary part containing the blood and centrifuge as before. After centrifuging there will be a grayish leucocyte mass merging into the column of erythrocytes. In very heavy infections the lower part of the leucocyte layer and the upper part of the erythrocyte column have a brownish appearance from the pigment in the parasites. Cut the capillary at a point about 0.1 to 0.2 cm. below the bottom of the leucocyte layer and with a small capillary draw out the small amount of erythrocytes and a little plasma to dilute them. Mix and make one or two blood spreads of the usual kind, which are stained and examined.

By a calculation based upon the quantity of blood required to make 100 blood films the authors find that one minute's examination of the film prepared by the centrifugation method yields the same result as 15 hours' examination of the ordinary blood film.

C. M. W.

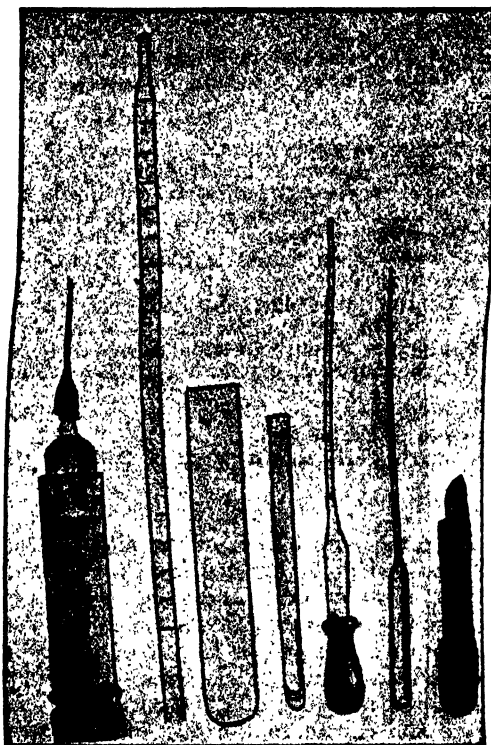


Fig. 1.



Fig. 2.

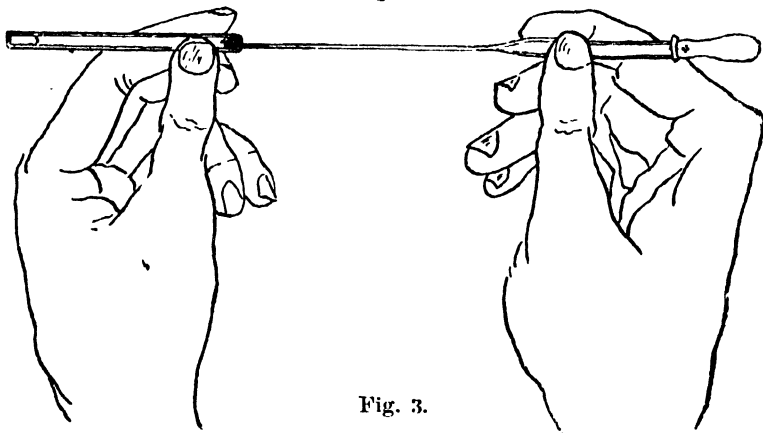


Fig. 3.

Apparatus for concentrating Malarial Plasmodia.



**KRAUSS (William) & FLEMING (J. S.). A Concentration Method for the Diagnosis of Malaria.**—*Southern Med. Jl.* 1916. Feb. Vol. 9. No. 2. pp. 141–145. With 2 figs.

The method is recommended in preference to the thick-film, as it is designed to remove the leucocytes, disintegrate the red cells, and exhibit the freed parasites in bulk.

A sterile bottle is part-filled with 10 cc. (or more if desired) of a solution made by adding 2 grammes of acid-free sodium citrate and 0·85 gramme of pure sodium chloride to 100 cc. of fresh-distilled water.

The blood to be examined is drawn from a vein by a sterile 2 c.c. all-glass syringe already part-charged with 0·5 cc. of the acid-free citrate solution, and the syringe full of the mixed blood and citrate solution is emptied into the bottle containing the rest of the citrate solution.

To free and preserve the parasites some 1 to 10 neutral solution of the official 37 per cent. formal is now added. A table showing the amount of this solution that may be added according to effects desired is given, but if a bottle originally containing 10 cc. of the citrate solution has been adopted the addition of 0·5 cc. of the 1 to 10 formal solution is usually sufficient. With this strength small rings are preserved in an hour, and larger forms in four hours.

The mixture is now spun for 10 to 15 minutes in the tube of a high-speed centrifuge, so that the leucocytes may be pipetted off. The pipetting must be done very carefully, otherwise gametes and large schizonts may come with the leucocytes. The tube is then filled up with distilled water, shaken to complete the liberation of the parasites, and again spun in the centrifuge, and after this the fluid is poured off and the precipitate containing the parasites is drained on to a slide, fixed, and stained.

If haste is desired the formal solution may be added at the source. Or if the blood comes from a long distance (24 to 48 hours, e.g.) two drops of the formal solution should be added to every 10 cc. of the mixture of citrate solution and blood, before it is sent.

A. A.

**BROHIER (Sam. L.). A Case of Masked Malaria.** (Correspondence.)—*Lancet.* 1916. Jan. 22. pp. 211–212.

An abstract of a case from the Gold Coast in which with an abundance of malarial parasites in the blood no clinical indication of malaria was apparent. The patient, a European, aged 33, had been accustomed to consume the better part of a bottle of whiskey daily. On admission to hospital though he had no fever, and no symptoms except casual vomiting, plenty of young forms of the subtertian parasites were found in the blood. The next day he was "practically well," and thereafter remained so, with the temperature subnormal, though an examination of the blood on the 14th day revealed numbers of crescents.

In speculating upon these conflicting phenomena the author impartially advances two alternative assumptions which might be held to explain the absence of the usual febrile symptoms, namely (a) that it might indicate an antitoxin competence, and so be evidence of immunity; or (b) that it might intimate a failure of reaction, and

so, notwithstanding the apparent well-being, might be presumptive of danger or even (with some very slight exciting cause) of an approaching catastrophe like coma or an attack of blackwater. In this particular case the author seems rather to incline to the latter assumption and attributed the "masking" of the febrile symptoms to the alcohol to which the patient was addicted. He further hazards the speculation that influences other than those attributable to alcohol may bring about a similar "masked" condition fraught with the same possibilities of disaster.

A. A.

**MARTELLI (Pier Nello).** **Contributo alla conoscenza del "tremore da malaria."** [A Contribution to our Knowledge of Malarial Tremor.]—*Malariologia*. 1915. Dec. 15. Vol. 8. No. 6. pp. 143–152. With 1 fig.

An account of two cases of tremor of the limbs coming on in the course of malaria, and subsiding with the disappearance of parasites from the blood, after the administration of quinine. Only two indubitable cases of this condition are on record, by FORNACA and CANTIERI [*Rivista Critica di Clinica Medica* 1912].

The patients in the present case were two brothers, aged respectively 6 and 4 years. An illustration is given of the elder child in a characteristic attitude. The head was retracted towards the left shoulder, while the right arm was strongly flexed at the elbow, and pronated, with the fist clenched; the left arm was similarly affected to a less degree. Both arms were agitated by a constant tremor, which persisted during sleep and was exaggerated on attempting to grasp anything. Aestivo-autumnal parasites were found in the blood. On half-gramme doses of quinine by the mouth and by injection, the symptom began to diminish on the fourth day, and had completely disappeared by the 10th. The younger child was admitted to hospital on the same date, October 4th, 1915, and presented the same symptoms in a slighter degree. It had already received a few doses of quinine, and the symptoms consequently began to diminish on the day after admission. Parasites of the same type were present in the blood. A similar treatment was adopted and the child left the hospital perfectly cured along with its brother on the 23rd of the month. The mother of the two children was under treatment in the hospital at the same time for the same description of fever.

Three other cases of malarial tremor are on record, by JOURDRAN, SPAGNOLIO and De VILLA, but the author considers them less typical. The differential diagnosis is discussed at length.

J. B. Nias.

**MONAGAS (Jesus).** **Algunas consideraciones acerca de fenomenos cerebrales de orden meningeos, observados en niños afectados de infeccion paludica aguda.** [Some Remarks on Cerebral Symptoms of a Meningeal Nature, observed in Children attacked with Pernicious Malarial Fever.]—*Bol. Asoc. Med. de Puerto Rico*. 1915. Dec. Vol. 12. No. 109. pp. 277–282.

Some brief notes on cerebral symptoms observed in six children, of ages ranging between 18 months and three years, who were attacked with pernicious malarial fever. Five recovered, while one died comatose within 24 hours of the commencement of symptoms. The treatment adopted was of an ordinary nature and consisted of baths, calomel and injections of quinine. The author observes that the possibility of a microscopic diagnosis is often precluded by the urgency of the symptoms.

J. B. N.

von **DZIEMBOWSKI** (Sigismund). **Eln Malariarezidiv nach Typhus-schutzimpfung.** [A Malarial Relapse after Inoculation for Typhoid.]—*Deut. Med. Woch.* 1915. Nov. 4. Vol. 41. No. 45. p. 1331.

A Russian prisoner of war was inoculated against typhoid and cholera. The effect of the inoculation was to cause an attack of malaria, in which benign tertian parasites were present in the blood. The paper shows that such inoculations may bring about relapses of malaria after fairly long intervals of freedom, though the exact period of immunity from the disease is not mentioned in the text.

C. M. W.

**HALL** (G. C.). **Quinine and Malaria.** (Correspondence.)—*Indian Med. Gaz.* 1916. Feb. Vol. 51. No. 2. p. 72.

From three years' experience with Indian troops in one of the most malarious districts in Upper Burma, where "no amount of quinine" brought down the percentage of sick-in-hospital (mostly malarial fevers) below 40 to 80 per cent. of regimental strength, the writer long ago drew the conclusion that "the curative effect" of quinine "in malaria is very slight indeed"; and in some selected extracts from the Indian Sanitary Report for 1913 recording (a) high permillages of admission for malaria in three large military centres where quinine was used according to custom, and (b) the isolated statement of a medical officer in one of these places that "the parasites resisted the effects of cinchonization," he finds complete confirmation of his own independent conclusion. And on conjecture of this kind he would "depose quinine from its pedestal and substitute iron," and would reprove the "bland and childlike faith" of those who treat malarial fevers with the old specific drug.

An argument not based on exact and exhaustive observation, from every point of view, may yet be entitled to respectful consideration if it conform to the rules of logic, and be expressed in terms that are quite precise. Here, however, the obvious fallacies of confusion only serve to bring to mind the aphorism of that sage old philosopher Thomas Hobbes, that the one thing needful in scientific criticism is "perspicuous words by exact definition first purged and snuffed from ambiguity."

A. A.

**MACDONALD** (Angus). **Quinine as Prophylactic in Malaria.** (Correspondence.)—*Trans. Soc. Trop. Med. & Hyg.* 1915. Dec. Vol. 9. No. 2. p. 74.

A letter chiefly remarkable for the stark enunciation of the proposition "that the general faith in the efficacy of quinine is a great hindrance to the elimination of the conditions that produce malaria, and that no sanitarian is justified in employing quinine as part of his warfare." To such a bald thesis most men will be content to answer, in the time-honoured academic fashion, *Nego*.

A. A.

ROUX (F.). **Les injections intra-veineuses de quinine basique à très faibles doses, dans la fièvre paludéenne.**—*Bull. Acad. Méd.* 1916. Feb. 1. Vol. 75. Ann. 80. No. 5. pp. 122-124.

Advocating the intravenous injection of quinine in weak doses. The injection used is a "pseudo-solution" of "basic quinine" of the strength of 2 to 3 mgm. in 1 cc. From 2 to 4 cc. of the "pseudo-solution" (according to the gravity of the case) are injected, with repetition, if necessary, the following day, or of half the original dose on the two following days. There is an evanescent reaction—rigors, which may be severe, and a rise of temperature, which in cases of heavy infection may reach 104° Fahr., or even higher.

It is claimed that this method is promptly efficacious against the access of fever where other methods of administering quinine have failed, and that probably its action upon all forms of the parasite is equally decisive. since in cases where the spleen is enlarged there is a rapid and very marked decrease of the hypertrophy and of the pain on pressure.

A. A.

LANE (Clayton). i. **Quinine in Malaria.** (Correspondence.)—*Indian Med. Gaz.* 1915. Aug. Vol. 50. No. 8. p. 314.

ii. **Tetanus and Hypodermic Quinine.** (Correspondence.)—*Ibid.* 1916. Jan. Vol. 51. No. 1. p. 33.

i. A mild censure of some defaults in STOTT's "Studies of Malaria" [this *Bulletin*, Vol. 6, p. 77], pointing out that in the administration of quinine, in cases where gastric absorption is doubtful, the hypodermic method is not a sole alternative to giving it by the mouth, but that two other options are well known, namely the intravenous and the rectal—the latter being extremely efficacious. Even when gastric absorption seems to be checked it is as well to make sure by trying the more soluble salts of quinine, for the writer states that in his own experience cases of malaria which have stubbornly resisted the sulphate have yielded at once to the extremely soluble bi-hydrochloride. The writer concludes by condemning the publication of *ex parte* objections to quinine, as tending to disparage the antimalarial measures of the Indian Government.

ii. A further criticism of STOTT's opinions upon quinine, again pointing out that the hypodermic method is not the absolutely necessary alternative to administration by the mouth, and gently ridiculing squeamish objections to the rectal method.

A. A.

STRICKLAND (C.). **Short Key to the Identification of the Larvae of the Common Anopheline Mosquitos of the Malay Peninsula. (For the Use of Medical Officers, and Others.)**—Illustrated by Miss K. O'CONNOR.—18 pp. Imp. 8vo. With 7 plates. 1915. Kuala Lumpur: Central Survey Office, F. M. S. [Price \$2.00].

Plates and tables differentiating, by means of the bristles of the clypeus and the cockades of the abdominal terga, the larvae of eleven common species of Anopheles of WALLACE's Indo-Malayan Subregion. The inquirer is reminded that the specific characters are not acquired until the larva is fairly well grown. Due acknowledgment is rendered to the careful and critical researches of Dr. A. T. STANTON.

It is concise perspicuous work of this kind, condensed upon recognised geographical regions, that medical officers want.

A. A.

CHRISTOPHERS (S. R.). **The Pilotaxy of Anopheles.**—*Indian Jl. Med. Research.* 1915. Oct. Vol. 3. No. 2. pp. 362-370. With 1 plate.

The interest of this paper is purely academic. The bristles of the head, thorax, and appendages are very fully and carefully described, and are shown to have a definite arrangement and to exhibit some specific modifications which, in the author's opinion, are worthy of comparative treatment from a phyletic standpoint.

A. A.

CHRISTOPHERS (S. R.). **The Male Genitalia of Anopheles.**—*Indian Jl. Med. Research.* 1915. Oct. Vol. 3. No. 2. pp. 371-394. With 6 plates.

Apart from its wealth of interesting and original descriptive detail the main bearing of this paper is taxonomic. The structure of the organs in question is described, and attention is directed particularly to certain bristles or spines, termed "claspette spines," having a definite location at the base of the claspers. The number, arrangement, and nature of these spines is shown—over a very extensive field of investigation—to be correlated with certain features of wing-colouring and vesture of prosternum, and also with the form of the larval cockades. In the characters of the male genitalia the author thus finds general confirmation of his previously published views of the classification of Anopheline mosquitoes. The author's original observations are illustrated by 36 well-executed figures.

A. A.

OVASSE (V. E.). **La malaria di Maccarese (1903-1914).** [Malaria in Maccarese from 1903-1914.]—*Giorn. d. R. Soc. Ital. d'Ig.* 1915. May 31. Vol. 37. No. 5. pp. 129-139. With 2 charts.

An administrative report on the progress of the malaria campaign in the district of Maccarese, near Rome, during the last 12 years. The great difficulty in this district, as in many others, is the large percentage of temporary agricultural labourers, who pass from under observation at the end of the summer imperfectly cured, to reappear in the following season as foci of infection. The district is one in which the prevalence of mosquitoes, and consequently of malaria, is remarkably dependent on the character of the season (v. Table I.).

J. B. N.

ZORINI (Carlo Omodei). **Della malaria e del suo avvenire in Lomellina.** [Malaria and its Incidence in Lomellina.]—*Malariologia.* 1915. Dec. 15. Vol. 8. No. 6. pp. 153-156.

A statistical report on the township of Candia Lomellina, showing a diminution of two-thirds in the number of cases of malaria in the last seven years. In 1914, only 34 cases of malaria were detected in a population of 3,000 persons. The quantity of quinine distributed amounted to, roughly, 8½ kilos.

J. B. N.

## THE INCIDENCE OF PLAGUE IN EUROPE.

The following statement has been received from Dr. C. STRICKLAND :

"Dr. Henderson SMITH criticising my contentions regarding the incidence of plague in East Anglia says that these seem quite unjustifiable [this *Bulletin*, Vol. 6, p. 411].

"The position is therefore this :—I say that there was scarcely any infection in 15,000 rats, because they were dispersed over the countryside. Dr. Henderson SMITH says that these rats were so slightly infected because they were not as a population infected—"It is of course only for infected populations that the relation between flea-rate and incidence is held to exist"—which is, it seems to me, begging the question.

"I have attempted to give an explanation of *why* these rats were not infected, based on the late Mr. MERRIMAN and my flea-work in East Anglia ; why in winter there should be much more likelihood of epizootics ; and why at any time there is very little chance now of epidemic plague ; and even if some reason for the non-infection, other than that the rats are not infected, be forthcoming for explaining the phenomena, nevertheless I have shown that there is a factor which is at least a powerful influence in the scale.

"Of course the climate of England may have changed so much since the 17th century that plague cannot now flourish, or the rats may be immune, or there may be other reasons for the facts as we now see them. Whatever they are, it would be most interesting to hear what they are from anyone who has a suggestion to make or some facts to give. At present the only argument in the field is that based on the bionomics of the brown rat."

## TROPICAL DISEASES BUREAU.

TROPICAL DISEASES  
BULLETIN.

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[No. 5.]

## SLEEPING SICKNESS.

RODHAIN (J.). **La Maladie du sommeil dans l'Ouellé (Congo belge) à la fin de 1914.**—*Bull. Soc. Path. Exot.* 1916. Jan. Vol. 9. No. 1. pp. 38-72. With a map.

The conclusions of this paper are to the following effect :—

*Distribution of Tsetse Flies.*—Several species of *Glossina* are found in the Ouellé District, the most widespread being *Glossina palpalis*; it occurs more or less numerously near the banks of all the large water-courses, in both the savannah and forest regions. It is usually abundant near rapids; it may be absent near small streams or the remote sources of the big rivers; in valleys where there is no woody vegetation or where this is replaced by papyrus it is absent. It is not found on the high plateau of the Aru. Tsetse flies of the *fusca* group are irregularly spread throughout the great forest, in the forest galleries of the Ouéré-Bili, and between the Ouellé and the Bomokandi. *Glossina morsitans* is found only in the eastern part of the territory between the Doungou and Garamba rivers, and to the north. [These points are shown in the map.]

*Sleeping Sickness.*—There are four foci of human trypanosomiasis. Two are situated on the western border in the Ibembo and Monga districts; there is a third to the north connected with the M'Bomu epidemic [French Congo] and occupying the Ouéré-Bili district; the fourth is situated to the east, round Aba. Besides these peripheral foci the disease has invaded the banks of the Ouellé River itself, there being a focus between Doungou and Souronga. Three small centres of localised infection are shown in addition on the map.

The spread of sleeping sickness in this region is mainly due to the movements of the human reservoirs of the virus and these are determined by causes which may be administrative, or connected with family or commercial intercourse. The two foci on the west are considered to be due to infected persons travelling for all these reasons; the focus in the north came into being chiefly owing to family and commercial relations among the natives themselves. The Aba focus must be considered as dependent on the Yei epidemic, which was introduced by the soldiers of the Congo State and by Uganda porters accompanying merchants. The central infection of the Ouellé river owes its origin to infected persons in the service of the Government.

*Prophylaxis.*—Prophylactic measures have been conducted with vigour against these known foci. They have been based on knowledge of the etiology of the disease, are supported by regulations co-ordinating the administrative measures taken to hinder its extension, and are rendered possible by the increase in the staff of the medical personnel. A systematic census has been taken of the sick; they have been placed in hospital or treated at liberty according to their condition. Villages in dangerous situations have been moved and clearings have been made in places frequented by tsetse flies. The measures taken against the focus in the north had to be limited to protection of the menaced frontiers. The scarcity of doctors has up to recently hindered energetic action against the central focus which, owing to its geographical position, is difficult to deal with. The recent ordinance of September 1914 gives increased powers to doctors and district authorities but, to ensure the success of their efforts, the medical personnel should be reinforced and the surveillance needed to ensure the execution of the measures prescribed must be made more effective.—

Much of the paper is of local interest. For a long time the Ouellé (or Welle as it used to be written) District, in the north-east of Belgian Congo, was considered to be free from sleeping sickness though *G. palpalis* had been known since 1903 to exist there. It was not till 1912 that cases were found, and in consequence the author was deputed to study the distribution of the disease and devise measures for its control. He spent one and a half years within its limits (1913-1914). The map shows how far apart these lie.

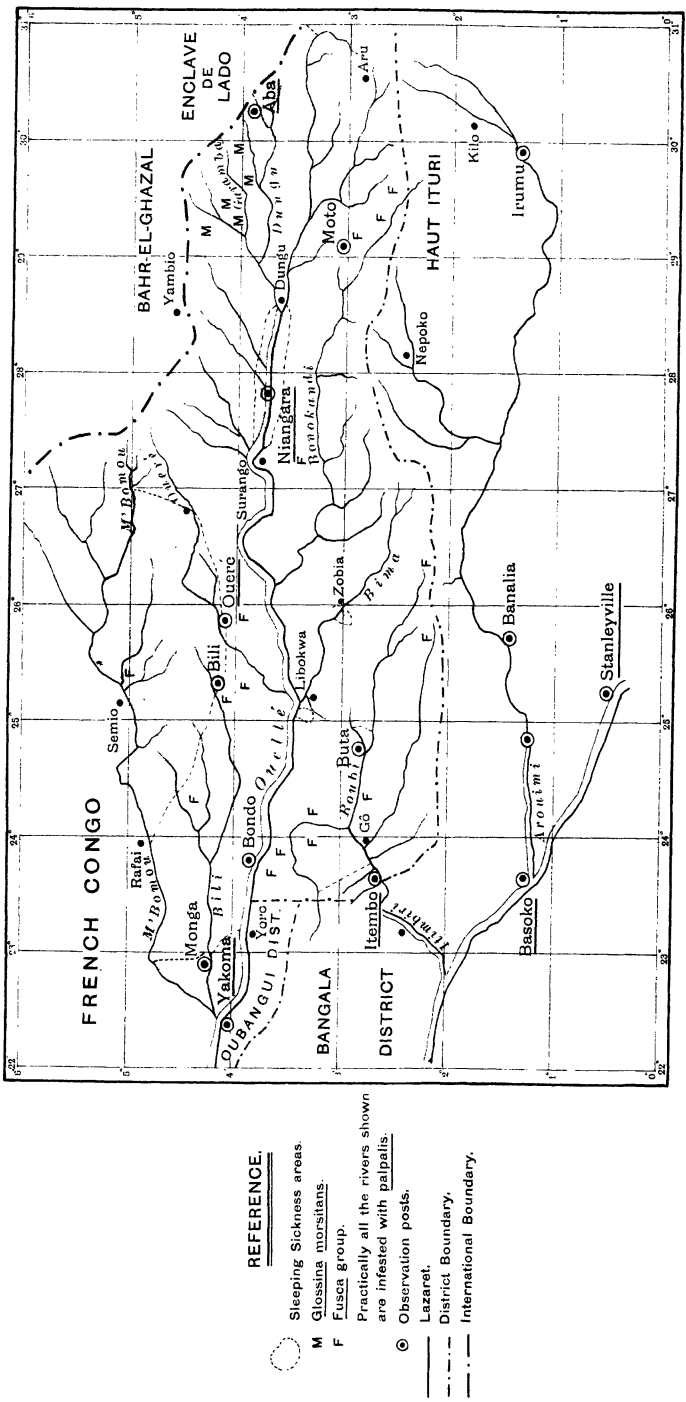
After a discussion on the distribution of *G. palpalis* and *G. morsitans* and the *fusca* group the author deals in turn with the foci shown on the map. Detailed tables are given of the results of examination of the natives in each, nearly 300,000 in all. Thus in the Ibembo focus 15,871 were seen and 76 found infected. Here, to the usual causes of the return of old soldiers who had become infected elsewhere, and visits of fishermen, are added the position of the lazaret—in a place constantly frequented by Glossina. Attention is drawn to the protective role played by the rapids at Voro and Gô. These bar the passage of canoes and, in the author's opinion, have checked the spread of infection up the Ouellé and Itimbiri rivers. He indicates a danger point on the southern frontier near which, in the Nepoko basin, auriferous deposits have been found and are about to be exploited.

The last section deals with prophylaxis. On rivers where there are no steamboats and in a country without railroads, it is recognised that human carriers are responsible for the extension of the disease; they must be searched for and dealt with and the causes which lead to their travels must be studied. The three causes mentioned in the conclusions are discussed. To show the influence of the administration two instances are given: among 67 patients admitted to the Ibembo lazaret in two years 61 were soldiers or their women, and of these 59 came from other districts; and in the author's journeys he discovered 10 patients among the native troops, seven of whom were introduced cases. The influence of family and tribal relations is shown on the northern frontier, both sides of which are occupied by the Azande and, as the author rightly remarks, geographical frontiers rarely correspond with tribal frontiers. Among commercial reasons the chief is rubber





Chart of OUELLÉ DISTRICT showing  
distribution of Sleeping Sickness at end of 1914.





collecting. The failure of the State, the ordinances of which were excellent, to control sleeping sickness is recognised to be due chiefly to lack of medical personnel. Other causes are that penalties for infraction of the laws were not severe enough, the apathy of the native chiefs, and the selfishness of traders. Excellent rules have been made for navigation and fishing but the surveillance is insufficient. As regards the Aba focus, which neighbours the Lado enclave where strict measures are in force, the author thinks that it will soon be extinct.

A. G. B.

**BOUILLIEZ (Marc).** Contribution à l'étude et à la répartition de quelques affections parasitaires au Moyen Charl (Afrique Centrale).—*Bull. Soc. Path. Exot.* 1916. Mar. Vol. 9. No. 3. pp. 143-167. With 6 text-figs & a map.

*Human trypanosomiasis.*—In an earlier paper the author has reported the presence of a focus of human trypanosomiasis in the Middle Shari district [see this *Bulletin*, Vol. 5, p. 86]. He has since had the opportunity of traversing a large part of this district and examining many natives. He has been unable to find patients infected with trypanosomes on any of the rivers excepting the Bahr Sara and a small focus, 25 kilometres to the west of Lai, on the Tendjibet river, in country which has been reoccupied since October 1914 [see map]. There is no trypanosomiasis at Lai itself. The presence at Fort Archambault of some women whom the war had brought from Goré enabled the author to examine them for trypanosomes, and several were found infected, showing that the disease exists on this part of the Penndé river. It is noted that the foci on the Penndé and that on the Bahr Sara join and are connected with the foci of the Ouahme, which is really only the Upper Bahr Sara [see this *Bulletin*, Vol. 6, p. 366, and map facing page 364]. In five villages, where the author is confident that he saw every native, 27 were found infected out of 565 examined. He has previously pointed to the numerous cases of importation amongst traders, boys, police and so forth. He notes now that a good number of traders coming from infected regions in the south avoid Archambault, going by other roads. He also says that the war has had a marked influence on the transactions and consequently on the comings and goings of traders, in consequence of the impossibility of their crossing Cameroon and going to Yola or Kano.

Cases of the disease which he has observed did not differ in their course from the classical descriptions. Not having been able, except at the end of his tours, to find *G. palpalis*, he made inoculations into various animals to see if he had to do with a species other than *T. gambiense*. The course of the infection in them was that of *T. gambiense*, but perhaps less virulent. Some of the monkeys lived a very long time and apparently recovered. They cite the case of a *C. patas* which was well after more than 14 months and other monkeys still alive after 9, 4 and 5 months. The infection is not acute enough for *T. rhodesiense*, but might be due to *T. nigeriense*, "if the slight pathogenicity for animals of a human virus is a character sufficient for the creation of a species." Morphologically the trypanosomes are identical with *T. gambiense*.

In the author's last journey, in September, he found some specimens of *G. palpalis* on the banks of the Moula river, and thinks if he had had more time the species would have been found elsewhere. *G. morsitans* he puts aside because it is common everywhere, whilst human trypanosomiasis is quite localised. The same is the case with *G. tachinoides*. He has begun tours of prophylaxis, making records of the patients and injecting 1 gm. of atoxyl as does OUZZILLEAU [this *Bulletin*, Vol. 6, p. 175]. He would make it obligatory for traders to go through certain places, where medical posts should be established.

*Trypanosomiasis of Animals.*—Those examined were equines, bovines, sheep and goats. *T. pecaudi* is most common and is perhaps the only trypanosome acquired in the Territory. It is found in horses and donkeys and kills a great many. *T. cazalbouri* and *T. dimorphon* have been found in animals passing through. Details are given of subinoculations with the last named trypanosome; dogs, cats, monkeys and a sheep became infected. Another trypanosome, found in a horse, belonged to the *dimorphon* group. It was smaller than the other and was inoculated without success into Cercopithecus monkeys, cats, rats and a genet. Some of the kids and dogs inoculated became infected. Its morphology, the author says, suggests *T. congolense*, *T. nanum*, or *T. pecorum*. [No measurements are given.]

A. G. B.

BOUET (G.). **Existence d'un petit foyer de trypanosomiase humaine à la Basse Côte d'Ivoire.**—*Bull. Soc. Path. Exot.* 1916. Mar. Vol. 9. No. 3. pp. 168–186.

In December 1914 trypanosomes were discovered in the blood of a half breed child who had lived *en pension* for four years at a school at Bingerville. With the exception of two cases in the preceding 12 months this was the first such discovery in the Lower Ivory Coast, though *G. palpalis* abounds; cases previously found had been introduced from the north—the Upper Ivory Coast or the Soudan. By the Lower Ivory Coast the author signifies the part between the coast and the northern limit of the tropical forest. In consequence of this discovery he undertook a search for sleeping sickness in Bingerville and its neighbourhood. All the other children in the school were carefully examined but no cases of infection were found. Tsetse flies are not rare at Bingerville, and especially in the neighbourhood of the lagoons. Enquiry showed that the children of the school used to go for walks and bring back collections of insects, so that it appeared the child might have been infected on one of these occasions. A methodical examination was made of the natives in the neighbourhood of Bingerville. Out of 665 blood examinations there was one positive result—in a native of Adjamé, who had been born there and had only visited neighbouring parts of the coast. Numerous tsetse flies were collected at this village. It is noted also that the natives working in the palm groves are being bitten all the time. It is stated that the natives do not know the disease and have no name for it. The patient, in whom trypanosomes were found was a man of 16 to 18; he had some mental symptoms and complained of headache, sometimes accompanied by fever, but there were no other symptoms, not even gland enlargement. Trypanosomes were only found in the blood on



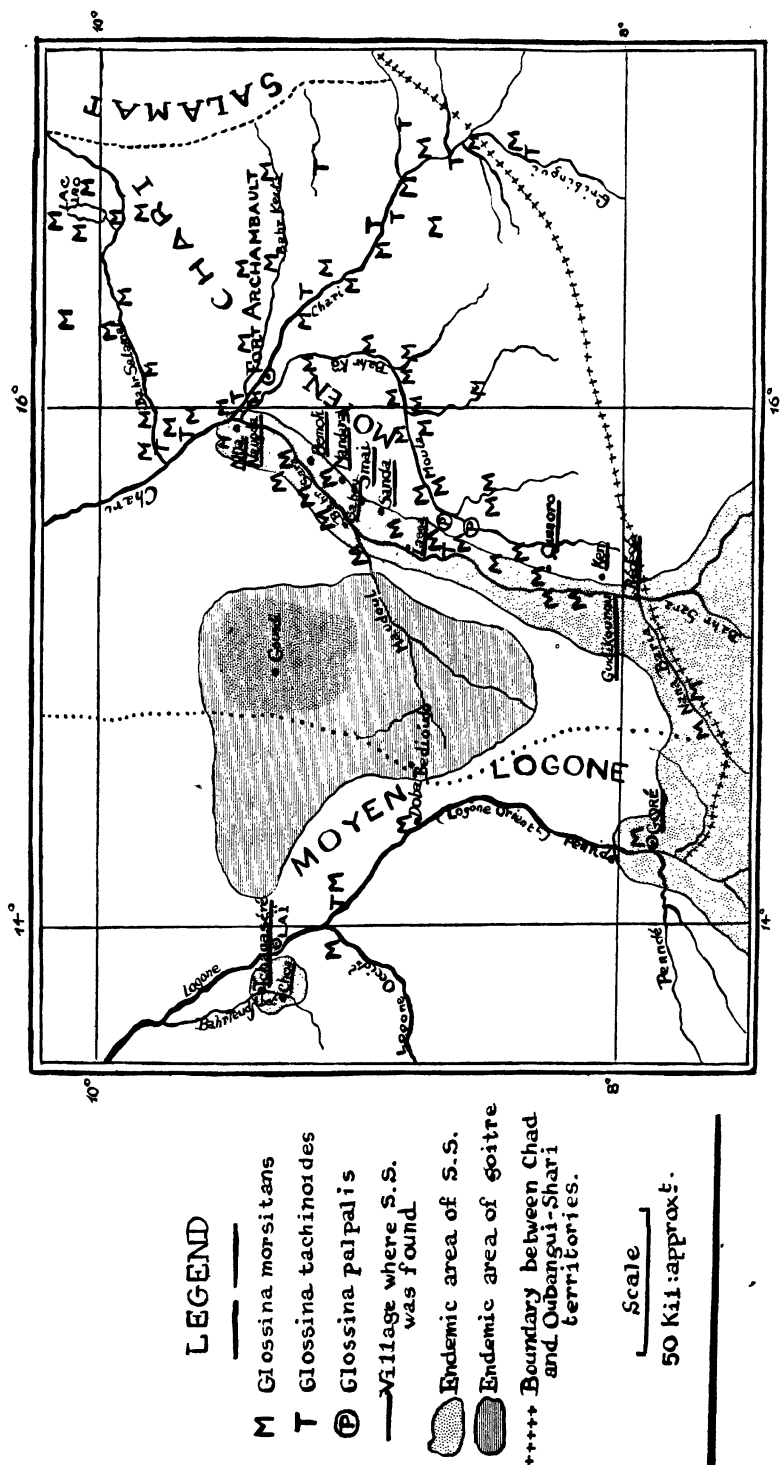


Chart of the Middle Shari District shewing the distribution of tsetse flies, sleeping sickness and goitre





the first occasion. It is noted that since Bingerville was laid out numerous cases of trypanosomiasis have been found there; the author himself discovered a case in a late stage in 1906—a man who had been there for two years. Such cases have doubtless formed the reservoir of the virus.

The author examined a number of domestic animals, both those about to be slaughtered and those which formed part of the Government herd. *T. cazalbouri* was found in a cow, which had probably been infected in the Upper Coast or the Soudan. No trypanosomes were found in 22 cattle of the Government herd; these were of the indigenous race. Of seven sheep one showed *T. dimorphon* and a horse showed *T. pecaui*. The natives possess very few domestic animals. Two antelopes were examined with a negative result. The author concludes that there is little chance of the human trypanosome creating a reservoir for itself outside its normal host, man.

The author examined 458 *G. palpalis* for flagellates; these were found in 12. The salivary glands were in every case free. From the character and site of the infections they were assigned to *T. dimorphon* and *T. cazalbouri*. The author does not think there is any serious fear of sleeping sickness becoming epidemic. The prophylactic measures recommended include the provision of sanitary passports for persons coming from the north and measures of deforestation against the flies. It is noted that the Comité Supérieur d'Hygiène of French Equatorial Africa has condemned the principle of segregation camps and shown that better results may be obtained by periodic sterilisation of the blood of the patients.

A. G. B.

JELLETT (J. W. H.). **Trypanosomiasis as a Cause of Irido-Cyclitis.**—*Ophthalmic Rev.* 1915. Vol. 34. pp. 41–44.

The case was that of a man employed in Northern Nigeria who returned in November 1913 suffering from "fever." In January 1914 his febrile attacks became less frequent and he went to Switzerland where his health improved, but he complained there of discomfort in the eyes. On his return the symptoms became more definite, there being at times congestion of the conjunctiva and episcleral tissues with tenderness and slight intolerance of light, and sometimes a slight rise of temperature. In May and October blood films were examined with a negative result and shortly after there was a well marked attack of irido-cyclitis in the right eye with marked keratitis punctata. The pupil dilated readily to atropine. In December the left eye became affected. Trypanosomes were then found in the blood. There was no other cause for the eye condition.

A. G. B.

VAN DEN BRANDEN (F.). **Valeur moyenne de la durée de stérilisation sanguine chez les trypanosés par une dose de salvarsan, néo-salvarsan, salvarsan cuprique et sel sodique du salvarsan cuprique.**—*Bull. Soc. Path. Exot.* 1916. Jan. Vol. 9. No. 1. pp. 13–15.

The author, who writes from Leopoldville, decided to determine the mean period of blood sterilisation brought about by a single injection of each of the substances named in the title. A single dose

of any of them may lead to definitive cure and in most cases the blood is rendered sterile for some months. The patients were in good condition with normal cerebro-spinal fluid. The results are summed up in tables, wherein are set down the name and weight, the dose and date of injection, the date of the last examination after triple centrifugation, and the duration of blood sterilisation. He concludes that :—

(1) A single dose of salvarsan, 0·01 gm. per kilo of weight, produced in four patients blood sterilisation lasting 2, 7, 7, and 8 months.

(2) After a dose of neosalvarsan of 0·013 gm. per kilo there was no relapse after 4, 8, 12 and 22 months.

(3) Salvarsan copper, in doses of 0·004 gm. per kilo, sterilised for 19, 23, 23 and 24 months. (These patients were followed up for a long time.)

(4) In the case of the sodium salt of salvarsan copper, 0·0053 gm. per kilo, the periods were 8, 8, 12 and 12 months.

The paper does not deal with the rapid relapses which occurred in some cases.

The author thinks that the four substances are capable of rendering good service in tours for the treatment of sleeping sickness, taken at intervals of some months.

A. G. B.

MESNIL (F.) & BLANCHARD (M.). **Sensibilité au sérum humain normal de Trypanosomes d'origine humaine.**—*Bull. Soc. Path. Exot.* 1916. Feb. Vol. 9. No. 2. pp. 81–85.

The authors refer to a paper by MESNIL, summarised in this *Bulletin*, Vol. 5, p. 97, which dealt with spontaneous variations of susceptibility of a strain of *T. gambiense* to normal human serum. MESNIL employed mice and gave relatively large doses of serum. They refer also to a paper by LAVERAN, noticed in this *Bulletin*, Vol. 6, p. 381, who showed that a strain of *T. gambiense*, which had been kept up for 12 years in laboratory animals, was still resistant to human serum. LAVERAN's experiments were made with guinea-pigs and relatively small doses of serum. The authors thought it would be well to test the susceptibility of their strain of *T. gambiense* under conditions comparable with those of LAVERAN. They therefore made three series of experiments on guinea-pigs, which are tabulated. Varying doses of serum were mixed with 1/10 cc. of diluted blood rich in trypanosomes and the mixture was injected into the peritoneum of the pigs. The tables show that 1 cc. of serum caused in one case a longer incubation and a greater duration of the disease than in the control; in two other cases, with serum 48 hours old, the animal failed to become infected, and this was the result in six cases where 5 cc. were employed. These results show that this strain differed very markedly from that of LAVERAN.

They then retested on mice their own strain 11 years after it had been isolated from the human organism. The figures obtained showed that the susceptibility to human serum was still further increased; it was only a little less than that of *T. rhodesiense*. After an account of some experiments with the virus called *lanfranchii*, obtained from the human infection contracted by Professor LANFRANCHI, the authors record conclusions to this effect :—

Five strains of trypanosomes of human origin have been carefully studied from the point of view of their susceptibility to human serum.

Two strains of *T. rhodesiense* showed themselves, a short time after their separation from the human body, relatively susceptible to human serum. One strain of *T. gambiense* tested by LAVERAN remained insusceptible after 12 years' maintenance in laboratory animals. Another strain of *T. gambiense*, that of the authors, is susceptible, the susceptibility having been established for the first time seven years after separation from the human body. It was then slight; since then it has varied and is now, after 11 years, almost as marked as that of *T. rhodesiense*. The strain *lanfranchii* showed itself susceptible to human serum about two years after its isolation from man; its susceptibility is comparable to that of *T. rhodesiense* and to that of the authors' strain of *T. gambiense*.

A. G. B.

LAVERAN (A.). **Diminution de virulence chez des trypanosomes ayant subi un grand nombre de passages par animaux de même espèce.**—*Bull. Soc. Path. Exot.* 1916. Feb. Vol. 9. No. 2. pp. 109–117.

The author has often found that the virulence of trypanosomes kept up for a long time in the same species of animal, guinea-pig or mouse, becomes attenuated, sometimes so much that there is fear of losing the virus. The trypanosomes appear late in the blood of animals inoculated and multiply slowly, so that the blood examination is often negative. The infection lasts longer and longer with successive passages and at last recovery, which is never observed at the beginning, becomes more and more frequent. In such a case the only hope of preserving the virus is to inoculate a different species of animal. In this paper examples are given of these observations in the case of *T. congolense* and *T. gambiense*.

*T. congolense*.—In 1906 the author received a guinea-pig from BRODEN infected with this trypanosome; it has since been kept up in guinea-pigs and mice. At the beginning the incubation period in guinea-pigs was seven to eight days, and the average duration 14 days. In the case of mice the average duration was 105 days. Guinea-pigs always died and mice almost always. Since 1910 the duration has become sensibly longer and more and more mice have recovered. The histories of eight guinea-pigs, inoculated in 1914 and 1915, are given. In one instance a guinea-pig, which had probably recovered from a slight infection after six months, was reinoculated and died; it had therefore not acquired immunity. Other guinea-pigs which had slight infections lasting 6 and 10 months were reinoculated and had slight reinfections; they have now probably recovered. In the case of mice ten examples are given and in five of these the mice did not become infected at all; otherwise the details resembled those of the guinea-pigs. One mouse, which had recovered from a slight infection, was reinoculated and died; here again there was no immunity. The author, fearing to lose the virus altogether, inoculated a dog on two occasions from guinea-pigs with very scarce trypanosomes. After a very long incubation period the dog became infected and the author hopes to regenerate the virus.

*T. gambiense*.—The strain of *T. gambiense* had been kept up for over 12 years, almost always in guinea-pigs. The histories of eight guinea-pigs recently inoculated are given. Six of these are examples of slight infection followed by cure in five months to a year. One

guinea-pig reinoculated became infected and succumbed to the re-infection. Two guinea-pigs which had been inoculated from a guinea-pig with a negative result were reinoculated with success by the use of a virus which had undergone 13 passages in a rat. One of the pigs succumbed a few days later.

The author asks if something analogous to this attenuation of virulence is not taking place in the case of *T. gambiense* in man. Sleeping sickness is very serious in countries recently invaded; later it runs a much longer course and recoveries may occur. But here the question is more involved because there is an intermediate host—the tsetse-fly—and the flies may sometimes become infected from wild animals.

M. MESNIL in the discussion gave similar examples. Owing to its gradual attenuation in mice he lost the virus of dourine four years after he had obtained it from ROUGET. The same has occurred with another dourine strain obtained from the Liverpool School of Tropical Medicine. Analogous observations have been made with *Schizotrypanum cruzi*. In 1912 Blanchard's strain killed mice in 15 to 20 days; later, grown mice contracted a slight and chronic infection and now even young mice are recovering.

A. G. B.

FIORI (C.) & DELANOË (M. et Mme P.). **Au sujet du dimorphisme du Trypanosome de Mazagan.**—*Bull. Soc. Path. Exot.* 1916. Feb. Vol. 9. No. 3. pp. 130–133. With 19 figs.

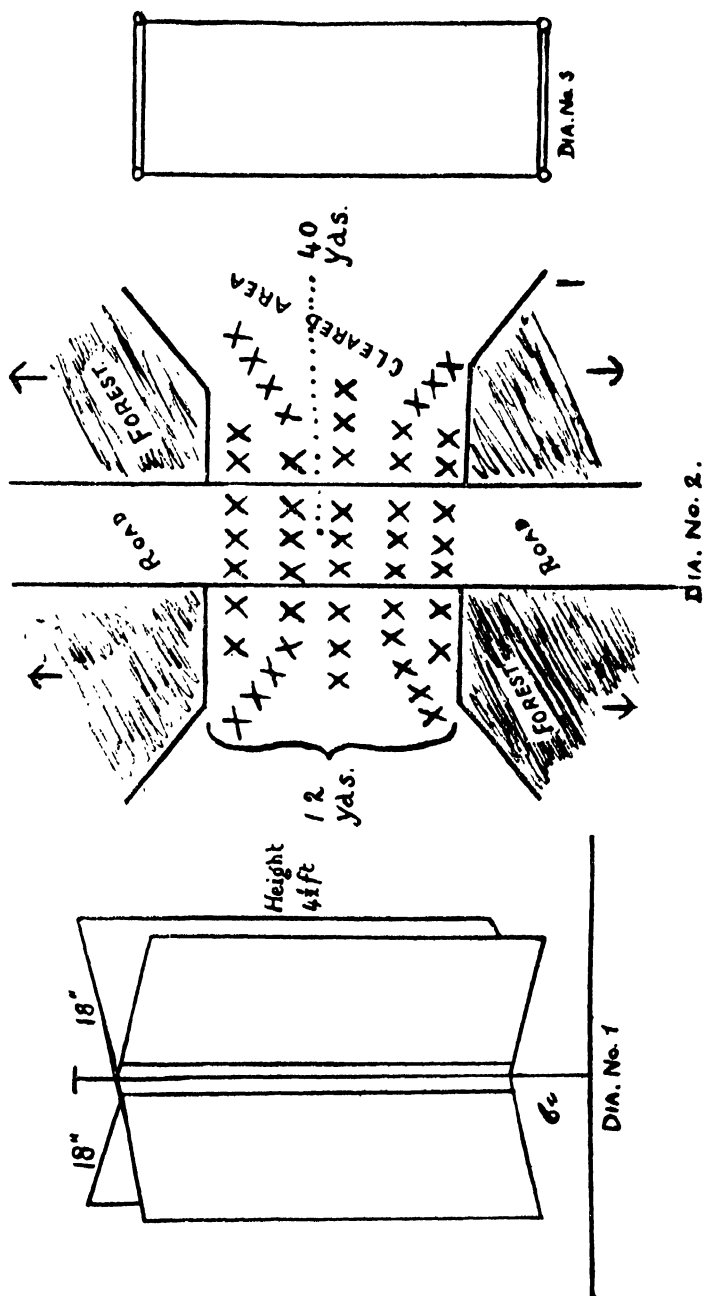
The authors refer to their previous note [see this *Bulletin*, Vol. 6, p. 377] in which they described the pathogenic trypanosome met with at Mazagan in a naturally infected horse. This trypanosome was dimorphic and the dimorphism had a tendency to become less at the first passage in the white rat, so that the authors thought that after successive passages in rats the trypanosome might end by becoming monomorphic. They say here that in the rabbit the tendency was the other way. They drew and measured 61 trypanosomes in the rabbit, 34 of which had no free flagellum. The maximum was  $36.1\mu$ , minimum  $15\mu$ , average  $26.1\mu$ . The trypanosomes of this rabbit had gone through two passages in dogs. In another rabbit inoculated from a white rat, which was inoculated from the horse, there was also a very distinct dimorphism. This morphological peculiarity seemed to the authors to differentiate this virus from the trypanosome of debab. Nineteen drawings of the trypanosome are given.

A. G. B.

SHIRCORE (J. O.). **A Method for the Trapping of *Glossina morsitans* suggested for Trial.**—*Trans. Soc. Trop. Med. & Hyg.* 1916. Jan. Vol. 9. No. 3. pp. 101–102. With 1 plate.

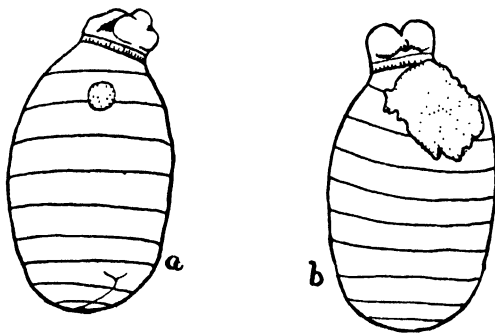
The diagram illustrates the traps suggested by Dr. Shircore. They consist of canvas screens smeared with sticky matter arranged on iron rods at right angles to a central support and twisting with the wind. Each trap has a catching area of six square yards. A large number of these are placed in a cleared space across a caravan road and it is suggested that the porters should pass slowly through or rest there, so that the flies which leave them may be attracted to the screens. Forty traps have a catching surface of 240 square yards, one yard being allowed between any two traps. The method is based on the known habits of tsetse flies.

A. G. B.

[*Trop. Dis. Bull.*Diagram to illustrate Method for Trapping *G. morsitans*.

- WATERSTON (James). i. **Chalcidoidea bred from *Glossina morsitans* in Northern Rhodesia.**—*Bull. Entomol. Res.* 1915. June. Vol. 6. Pt. 1. pp. 69–82. With 5 text-figs.
- ii. **Chalcidoidea bred from *Glossina morsitans* in Nyasaland.**—*Ibid.* 1916. Feb. Pt. 4. pp. 381–393. With 9 text-figs.

The Chalcidoidea which are the subject of these papers were bred from puparia of *G. morsitans* collected in Rhodesia by LLOYD and EMINSON, and in Nyasaland by LAMBORN. They include six species, which are described with figures. The holes of emergence of two are shown.



Puparia of *Glossina* showing holes of emergence  
of: a, *Syntomosphyrum glossinae*, Wtst.;  
b, *Stomatoceras micans*, Wtst.

[A similar pair of figures is given by CARPENTER in his Progress Report on Investigations into the Bionomics of *Glossina palpalis* (*Reports of the Sleeping Sickness Commission of the Royal Society*, No. 12, p. 89). The jagged hole is attributed to an enemy which devours the contents of the pupa from outside.]

A. G. B.

## YELLOW FEVER.

JOHNSTONE (R. W.). **Report to the Local Government Board on the Progress and Diffusion of I. Plague. II. Cholera. III. Yellow Fever throughout the world during the Year 1913.**—*Rep. to Local Govt. Brd. on Pub. Health & Med. Subjects.* vi.+110 pp. 1915. London: Printed under the Authority of H. M. Stationery Office.

As the title indicates the paper is a review of the outbreaks of yellow fever recorded during the year 1913. A short account is given of the investigations of SEIDELIN, MACFIE and JOHNSTON in West Africa on the presence of *Paraplasma flavigenum* in yellow fever cases and in other apparently healthy individuals which are supposed to be carriers of the disease. Their claim to have infected guinea-pigs and rats with these bodies is also mentioned, though no reference is made to the finding of apparently identical bodies in healthy guinea-pigs in England by several observers.

In West Africa in 1913 yellow fever was recorded from Nigeria (29 cases in Lagos), Togoland, the Gold Coast Colony, Portuguese Guinea, Senegal and French Congo; in South and Central America the disease was noted in many places: in Brazil, at Manaos (39 deaths), Para (4 deaths), Ceara (8 cases), Pernambuco (3 deaths), Bahia (78 cases, 54 deaths), and Rio de Janeiro (3 imported cases). In Venezuela nine cases were recorded from Caracas, and in Colombia one case from Carthagena. In Peru a few cases were recorded at Iquitos early in the year. During the year the disease continued to be epidemic in a number of towns of Ecuador, such as Guayaquil (221 cases, 123 deaths), Milagro (66 cases, 34 deaths), Naranjito (38 cases, 24 deaths), Duran (18 cases, 9 deaths), Agua Piedra (10 cases, 6 deaths), Bucay (9 cases, 5 deaths), Babahoyo (2 cases, 2 deaths), Yaguachi (1 case), making a total of 365 cases and 203 deaths. Yellow fever was reported from a number of places in Mexico, including Campeachy, where there were 34 cases and 17 deaths. In the West Indies cases occurred at Havana on board the steamship "Hydra" coming from Manaos and steamship "Morro Castle" from Campeachy. No extension of the disease occurred on shore. Application of modern measures has caused the entire disappearance of the disease in Cuba, a former hotbed of infection. In Trinidad a localised outbreak occurred at Brighton, some 40 miles distant from Port of Spain. The origin of this epidemic of 10 cases is obscure.

On British ships no case of the disease was recorded as being on board at time of arrival at British ports, but several cases occurred at the port of departure or at the beginning of the voyage for England. Three cases occurred on two Liverpool-bound vessels, one of which came from the Amazon and the other from West Africa.

C. M. Wenyon.

YELLOW FEVER COMMISSION (WEST AFRICA). **Third Report.** ii+51 pp. 1915. London: J. & A. Churchill. [Price 1s. 6d. net.]

The first two Reports of the Commission were summarised in this *Bulletin*, Vol. 5, No. 2, 1915. Since they were issued Dr. Andrew BALFOUR, C.M.G., has been appointed by the Secretary of State to be a member of the Commission.

No case of yellow fever has been reported from the West African colonies since February 15th, 1914.

The present report deals with the questions of the occurrence and significance of the bodies with which the name of Dr. Harald SEIDELIN is associated, and his case in favour of the "*Paraplasma flavigenum*" as the organism of the disease is stated in his own words as far as this has been consistent with the necessary limits of the Report. With Dr. SEIDELIN's claims those interested in the disease are already familiar.

Before considering in detail the various questions which arise in connection with "*Paraplasma flavigenum*," a succinct statement is set out of the facts at present known concerning the virus of yellow fever, together with Dr. SEIDELIN's views upon them, and their relationship to his bodies.

"(1) It is certainly transmitted by the *Stegomyia fasciata*. It is not known to be transmitted under normal conditions in any other way.

"Dr. Seidelin is of opinion that 'the axiom that Yellow Fever is transmitted by no other mosquito than the *Stegomyia fasciata*' is 'an assertion entirely without proof,' and also that 'Yellow Fever is transmitted in nature by no other means than mosquitoes has never been proved, but is extremely probable in view of our knowledge of protozoal diseases.'

"It might have been added 'and in view of our knowledge of the effects upon the incidence of the disease afforded by the destruction of the *Stegomyia fasciata*.'

"(2) The transmission can only take place after the Yellow Fever parasite has undergone a development in the mosquito, the duration of which is, approximately, twelve days.

"Dr. Seidelin considers that 'this theory is likely to be correct, but has not been conclusively proved.'

"(3) The virus will pass through a Berkefeld filter and belongs to the class to which the term ultra-microscopic is usually applied.

"It has been objected that the parasite as described by Dr. Seidelin cannot be supposed to be able to pass through a Berkefeld filter.

"Dr. Seidelin meets this objection by the suggestion that there may be an earlier stage in the evolution of the parasite in which it is invisible and able to pass through the filter.

"(4) The blood of the Yellow Fever patient is infectious only during the early period of the disease, probably not after the third day.

"Dr. Seidelin does not accept the view of 'the three days' infectiousness'; he believes that 'a dogma in medicine has never been established on poorer evidence.'

"It is not possible within the necessary limits of this report to consider the evidence upon which this view has obtained general acceptance. Those interested in the question who still entertain doubts are referred to the original reports of the American Yellow Fever Commission."

The Report then proceeds to discuss the evidence in favour of the acceptance of "*Paraplasma flavigenum*" as the causal agent of yellow fever and to point out that its acceptance involves the admission of the following propositions:—

"(a) They are found in the blood of patients suffering from Yellow Fever.

"(b) They are not found in human blood under other conditions.

"(c) They are found in the blood and tissues of animals (guinea-pigs, white rats, dogs and monkeys) inoculated with blood from Yellow Fever patients.

"(d) These animals are suffering from Yellow Fever.

"(e) From such animals by sub-inoculation the disease (Yellow Fever) may be transmitted to successive generations and in the blood the specific bodies are found.



"(f) If the bodies are found in the blood or tissues of animals which have not been thus dealt with, such animals are the subjects of a natural infection."

These propositions are then discussed in detail.

In dealing with proposition (a) the Commission finds that sufficient proof has been adduced that these bodies have been found in the blood of a very large number of cases of yellow fever.

"It is, however, hardly necessary to point out that this is only one link in the chain of evidence upon the integrity of which the claim is founded.

"If it can be shown that similar bodies are of frequent occurrence in the blood or tissues of man or animals apart from any suspicion of Yellow Fever, it is obvious that the whole contention falls to the ground, and that there is no necessity for any further discussion as to their specific nature."

As to the question of their absence from human blood in other conditions (proposition (b)), the Report, after first stating the control observations of Dr. SEIDELIN and other observers, refers to the cases "in which Dr. Seidelin himself admits that the diagnosis of yellow fever was at least sufficiently doubtful to require careful examination, or to need the construction of a theory to account for the presence of *Paraplasma flavigenum* under the circumstances in which it was found."

The following remarks are made in connection with the presence of the bodies in the blood and tissues of animals inoculated with blood from yellow fever cases (propositions (c) and (d)).

"The evidence here given is, we think, sufficient to justify the conclusion that these bodies may be found in the blood of guinea-pigs and other animals which have been inoculated with blood from Yellow Fever patients.

"But here, again, the same caution is necessary in accepting the evidence as proof of the specific nature of the parasites, as, if they can be shown to be present in the blood of guinea-pigs and other animals which have not been thus treated, the whole argument fails.

"The suggestion that non-inoculated animals in which the parasites are found must be reservoirs of Yellow Fever is ingenious, but not convincing; the more scientific method would be to institute an extensive research in animals of the same species which have never been in a Yellow Fever country."

In dealing with the question of the absence of the bodies from the blood and tissues of animals not inoculated with blood from yellow fever patients, the Commission requested Dr. David THOMSON to examine the blood of guinea-pigs in London for the presence of Seidelin bodies. Twenty-five animals were examined. In all except four, bodies resembling SEIDELIN's yellow fever parasites were found. Dr. THOMSON came to the conclusion that:—

"With regard to the nature and origin of these bodies no dogmatic statement is possible, but that it is highly probable they arise from various sources. Without doubt the great majority of them are artefacts, and cannot be considered as protozoal in nature, though some of those consisting of a reddish ring with a darker staining centre may possibly be an early stage in the *Lymphocytozoon cobayae* (Kurloff bodies), which were found in practically all of the guinea-pigs examined."

As regards propositions (e) and (f) the evidence that is relied on to prove these statements is that:—

"(a) A certain type of pyrexia is observed in the inoculated animal,

"(b) albuminuria occurs,

"(c) the *Paraplasma flavigenum* is found in the peripheral blood during life,

"(d) the same organism is found in the blood and tissues after death,

"(e) certain lesions are found in the gastro-intestinal tract and in the kidneys, similar to those observed after death from Yellow Fever."

The Commission is of opinion that the evidence on these points, which cannot be reviewed here in any detail, fails.

The conclusions arrived at by Dr. C. M. WENYON and Dr. G. C. Low as a result of their investigations here on the occurrence of *Paraplasma flavigenum* in the blood of normal guinea-pigs [see this *Bulletin*, Vol. 5, p. 79] are embodied in the Report.

The Report ends with the following list of conclusions at which the Commission has arrived:—

"1. That no proof has been given that the bodies named *Paraplasma flavigenum* are of protozoal nature.

"2. That under that name a number of microscopic objects are included.

"3. That, excluding artefacts, the origin of most of these objects is at present uncertain, and so far none have been proved to possess any definite physiological or pathological importance.

"4. That there is so far no reason to regard any of these objects as the cause of Yellow Fever.

"5. That the nature of the virus of Yellow Fever still remains undetermined."

E. J. Wyler.

**YELLOW FEVER COMMISSION (WEST AFRICA). Reports on Questions connected with the Investigation of Non-Malarial Fevers in West Africa.** *Yellow Fever Bureau Bulletin*. Yellow Fever Commission.—Investigators' Reports. Supplement. Volumes I & II.—752 pp. With maps & illustrations. 1915. Liverpool: The University Press of Liverpool. [Price 25s. net. (For Subscribers to the *Bulletin* 21s. net)].

These two volumes, containing between them 752 pages, are the reports of the investigators employed in West Africa by the Yellow Fever Commission. They are published by the Committee "as a basis for criticism and discussion." They deal with non-malarial and, incidentally, with malarial fevers studied in Nigeria, Sierra Leone and the Gold Coast and with experimental work done in these countries and in England. One of the investigators visited Guayaquil and reports on the cases of yellow fever seen by him there [see this *Bulletin*, Vol. 5, p. 76]. In the review of these volumes it is proposed to give some account of the epidemiological and clinical observations made in each of the three colonies, and then a brief synopsis of the experimental work. No opportunity for the study of yellow fever seems to have occurred except in Nigeria.

*Sierra Leone*.—Four of the reports concern Sierra Leone, by Major STATHAM, R.A.M.C., Dr. G. C. BUTLER, and Drs. J. M. DALZIEL and W. B. JOHNSON. The work of the first two investigators was carried out independently but contemporaneously at Freetown from May to September 1913, at which date Dalziel and Johnson commenced observations at the same place. There are consequently three sets of tables of the fevers met with at Freetown which are to some extent comparable. Statham reports on 1,100 cases of fever, nearly three-fourths from military hospitals, including 483 West Indians, 270 Europeans, 312 West Africans and 21 Syrians; 131 were children.

All but 150 were hospital in-patients and could be kept under observation; furthermore the soldiers came under observation at the outset. Butler had 342 cases, 298 of which were seen either as in- or out-patients at the Colonial Hospital; 270 were West African natives. Dalziel and Johnson's cases were apparently from the same source; they numbered 461; 419 were West Africans.

The accompanying table is compiled from three in the text, several conditions recorded once only being excluded. The minimum to constitute a fever case was, in Statham and Butler's statistics, a temperature of 100° F. and at least one day of fever.

Table of Statistics.

Disease.	STATHAM (adults only).	BUTLER.	DALZIEL and JOHNSON.	
Malaria .. .. .	676	201	221	All proved microscopically.
Probable malaria ..	49	—	37	Statham's were the severer forms leading to admission to hospital.
Ankylostome fever or Helminthiasis	22	—	15	
Bronchitis .. .. .	20	5	25	
Pyogenic .. .. .	13	—	—	Diarrhoea a prominent symptom. Outpatient Africans whose blood showed a high eosinophile count. Outpatients.
Syphilis .. .. .	13	—	2	
Rheumatism .. .. .	12	—	5	
Blackwater .. .. .	6	2	1	
Tubercle or Phthisis ..	5	10	6	
Pneumonia .. .. .	6	14	13	
Jaundice (Catarrhal) ..	5	—	3	
Trypanosomiasis .. ..	2	1	6	
Hepatitis .. .. .	2	—	4	
Typhoid .. .. .	1	2	2	
Whooping cough .. ..	—	2	4	
Pleurisy .. .. .	—	2	9	
Septicaemia .. .. .	—	2	1	
Dysentery .. .. .	—	1	2	
Acute rheumatism .. ..	—	1	1	
Yellow fever .. .. .	—	—	1	
Coryza .. .. .	—	—	20	
Enteritis and Pyrexia (?)	25	—	—	
Ankylostomiasis (?) ..	12	—	—	
Kala Azar (?) .. .. .	5	—	—	
Diarrhoea .. .. .	—	—	4	
Constipation .. .. .	—	—	9	
Dyspepsia .. .. .	—	—	6	
Cirrhosis of Liver .. ..	—	—	2	
Stomatitis .. .. .	—	—	2	
Adenitis .. .. .	—	—	5	
Doubtful .. .. .	85	48	33	Tabulated with details by STATHAM & BUTLER.

As regards the laboratory methods employed, Statham and Butler used dry blood films and made a differential leucocyte count, the former

invariably, the latter when malarial parasites were not found. Urine examinations were made by the M. O.'s in charge; nitric acid and heat were used. The stools were examined in many cases.

In Statham's 676 cases of malaria, forming 83 per cent. of fevers in adults, all but 10 were sub-tertian, though quartans and tertians formed 20 per cent. of the parasites found in 100 sick children. He does not think that pappataci fever or epidemic dengue occur in Sierra Leone. He believes that some of his "rheumatism" cases may have been ankylostome fever. He notes that the "doubtful" cases decreased in number as the blood examinations became more frequent and prolonged.

Butler points out that his malarial cases form 60 per cent. of the whole; his subtertian cases formed 95 per cent. of the total, quartan being 4.5 per cent. and benign tertian 0.5 per cent. He divides his "doubtful" cases into pyrexia of short duration, and pyrexia of more than seven days' duration.

In Dalziel and Johnson's cases a diagnosis of malaria was made in 48 per cent. on the strength of finding "the parasites present in sufficient numbers to justify that diagnosis." In 28 cases, including 12 of malaria, there was jaundice. The two typhoids were natives.

With regard to the Problems for Investigators, which were set out in detail in this *Bulletin*, Vol. 5, pp. 71-2, Statham considers that typhoid is more prevalent than is at present supposed and that leishmaniasis is also present, if rare. He thinks that malaria can produce bilious remittent fever and malignant bilious remittent fever and that these types are more likely to occur in persons with incompetent livers.

*Albuminuria.*—Statham and Butler discuss the significance of albuminuria in natives. In Statham's cases albumin was present in 9 of 75 cases among Europeans and in 32 of 75 natives. He attributes this largely to urethral affections, and possibly to ankylostomiasis. Casts were rarely or never found. Butler examined 437 urines at the Colonial Hospital; 189, or 43 per cent., showed albumin in quantities from a trace upwards, and 60, or 13 per cent., in some quantity; he remarks that a prostatitis or gleet is almost the rule in natives above a certain age.

*Febrile Diseases of Children.*—Statham tabulates the diseases in children separately owing to the fact that "some two-thirds of them always harbour malarial parasites in their blood." In 33 of the 131 malaria was the only obvious cause, and in 60 bronchitis, whooping cough or other cause was associated with the malaria. Butler examined 100 supposed healthy children between 3 and 10 who were at school; 49 showed parasites (41 subtertian and 8 quartan). Dalziel and Johnson found malaria in about 85 per cent. of febrile illnesses in 93 children.

*Infant mortality.*—Statham cannot throw light on the high infantile mortality. He does not think it attributable to syphilis. "To what extent the universal infection of native children with malaria affects the mortality rate it is impossible to say." Butler thinks that syphilis "very largely affects the rate of infantile mortality in Freetown." He obtained an account of their pregnancies from 263 women; 804 pregnancies were accounted for, and these included 111, or 13.8 per cent. still-births or miscarriages. He thinks that acquired syphilis is very common; congenital syphilis is rarely seen.

Dalziel and Johnson had one case of yellow fever, in a European stationed 60 miles from Freetown. They note the comparative freedom of Freetown from mosquitoes; those seen are usually *Stegomyia* or *Culicomyia*.

Dalziel and Johnson also contribute notes on a visit to Sherboro District in search of cases of fever suitable for study. This is situated on the coast of Sierra Leone and consists of two lowlying islands and a peninsula. It was in the dry season and no *Stegomyia* were found. Few cases of illness were seen.

*Gold Coast.*—Three Reports deal with the Gold Coast, those of Drs. H. S. COGHILL and H. M. HÄNSCHELL, and H. M. HÄNSCHELL alone, with work done at Sekondi and in the Northern Territories, and that of Dr. G. E. H. LE FANU with work done at Quittah. Le Fanu's contribution is a detailed table and an appendix in which special cases are described. The table records 43 cases of fever, 29 of which were in children under ten; in 38 malarial parasites were found. One case—in which death occurred—was diagnosed as ankylostomiasis and another as yellow fever. This case is reported in detail on pp. 589–93.

Coghill and Hänschell's work at Sekondi lasted from April 1913 to, in the case of Hänschell, April 1914. No case of yellow fever was observed; one supposed case turned out to be streptococcal septicaemia. They examined 373 patients—87 Europeans and 286 natives. Blood examinations were made of these and also of 233 healthy persons, or 606 in all; 72 were children. Malarial parasites were found in 259, or 42 per cent.; nine of these persons had also albuminuria and jaundice. Benign tertian parasites were found in 60 cases, quartan in 84, and subtertian in 189, many persons harbouring more than one variety. A list of diseases observed in Europeans and natives respectively is given; malaria is far ahead in each case. Details are appended of the cases with albuminuria.

Hänschell discusses questions bearing on the endemicity of yellow fever. A year's observation showed him that mosquitoes were very rare in Sekondi. Notes are given of the flora and fauna of *S. fasciata*. Blood films from men and various animals were searched for *Paraplasma flavigenum*; bodies resembling this were often found but "all lacked definition and constancy of outline and staining property." Four hundred and sixty-four blood films were examined in the second half year and differential counts made. The average large mononuclear leucocyte count, for cases in which no malarial parasites could be found in a thick film, was between 9 and 11 per cent. When it was 13 per cent. and over malarial parasites could be demonstrated. The blood of 53 school children in Sekondi was examined; malarial parasites were found in 29, or 54 per cent. The author notes that anopheles are extremely rare in Sekondi and surmises that these infections were contracted one or more years ago. The splenic index is not given.

In the course of the enquiry at Sekondi two cases of yellow fever were reported at Bole in the Northern Territories and Dr. Coghill went to investigate. Previous suspicious cases had occurred in two native policemen who had attended the dispensary, but no notes could be found. According to the natives there had been an epidemic of

some sort in 1910 with symptoms suggestive of yellow fever. An attempt is made to trace the course of this disease, which was supposed to have originated in the Moshi country, Senegal.

*Nigeria.*—The first 206 pages of Vol. 1 are occupied by "Four Reports on Yellow Fever in Nigeria during 1913" by Dr. E. J. WYLER. The cases reported on occurred at Abeokuta, Lagos, in the Central Province, and on board ship. Maps, plans and temperature charts are supplied and all details are set down. In Report No. 1 the patient, a European trader, had not slept outside his house at Abeokuta for three months. He died in Lagos Hospital on May 14th having come from Abeokuta (64 miles distant), at which place it is shown that he must have acquired his infection, on May 10th, 1913. It is stated in another part of the volume that this was the first authentic case of yellow fever in Nigeria. The author analysed the cases of malaria occurring at Lagos during 1912 and in 1913 up to the date of the patient's death. Of 127 cases 21 had albuminuria, and in ten of these (six being seamen) the albuminuria could not be accounted for by the temperature or other causes. A table of these is given. In two only was there record of a blood examination. It is suggested that they were really mild yellow fever. The notes of one are appended. It is stated that the conditions throughout Abeokuta are very favourable to the breeding of *S. fasciata*. Water is stored on the native compounds in large earthenware vessels, each compound containing many. Of forty compounds examined larvae of *Stegomyia* were found in all. The sanitary conditions in Abeokuta, a town of over 50,000 inhabitants, are described as deplorable. It is pointed out that the disease might have been introduced from Lagos via the railway or from Dahomey, with which country there is free communication by many routes.

Points to which attention is drawn in the conclusions are that this was an isolated case of yellow fever in a large native town, that the infecting insect must have received the virus from a native, that the salient feature of the disease in a native is probably unexplained albuminuria and that the reason why epidemics usually start at the coast towns is that the (non-immune) Europeans are mostly congregated there. Details of this patient's case are to be found on page 216 of the volume.

In Report No. 2 there is nothing that calls for notice.

Report No. 3 concerns a Syrian case and three native cases at Abeokuta, two of the latter having been treated as outpatients. The clinical history is given in each instance; there are few details in the case of the natives.

Report No. 4 is a long one, dealing with fever at Warri, Forcados and Burutu, and thirty-three cases on ocean-going vessels and dredgers in 1913 and 1914. Incidentally there is a discussion whether a urethral discharge interferes with the tests for renal albuminuria. Albuminuria being regarded of great significance in the diagnosis of mild cases of yellow fever, and gonorrhoea being prevalent among the natives, this question becomes of importance. The author had the opportunity of testing the urine in seven cases of uncomplicated gonorrhoea, and found that a very faint cloud appeared on boiling, after one hour's or more standing.

Four native cases discussed here occurred in the Forcados gaol and three of the patients had been inmates for five, six and eight months

respectively. These are difficult to explain as the sanitary conditions are described as efficient and the author puts forward the suggestion that the yellow fever organism, having gained access to a man, may remain latent in him till "stimulated into activity by some debilitating influence acting on the host." The whole report is full of detail and cannot be summarised.

A Report on certain outbreaks of yellow fever in Lagos, 1913, and January and February, 1914, is given by Dr. T. M. RUSSELL LEONARD. There were in all 38 cases, ten of which died and the rest recovered; 15 were Europeans and 13 of these sea-faring men. Of twenty negroes all recovered. A very complete account of these cases is given, followed by a synopsis of the symptoms and by appendices. In Appendix A is discussed the diagnosis between yellow fever, bilious remittent and pappataci fevers, and questions of immunity. It is considered that Facet's sign, albumin in the urine and epigastralgia distinguish yellow fever from bilious remittent fever, but both may occur together. In Appendix B a disease is discussed known to the natives as "uto enyen" or yellow eyes, and in Appendix C statistics showing the presence of the malarial parasite in cases of malaria and other fevers in Lagos. It was found in 13 cases of yellow fever. Three cases of pappataci fever are recorded.

The appendix to Dr. O'Brien's account of his visit to Guayaquil contains details of several cases, which may be compared with the details of the Nigeria cases.

*Experimental Work.*—Experimental work was carried out at Accra in the Gold Coast, and Lagos in Nigeria by Drs. H. SEIDELIN, A. CONNALL and J. E. L. JOHNSTON, and in England by Dr. D. THOMSON and Major D. S. HARVEY. Blood slides were also examined by Dr. C. M. WENYON.

Seidelin and Connall writing on Experimental Yellow Fever in Laboratory Animals conclude that "the yellow fever parasite, *Paraplasma flavigenum*, has been transmitted to guinea-pigs and monkeys by direct inoculation of blood; that the infection has been carried seriatim through 23 guinea-pigs; that the peripheral blood of the infected animals contains forms of the parasites identical with those occurring in human blood in yellow fever; and that various internal organs of the infected animals, particularly the lungs, contain elements regarded as division forms of *P. flavigenum*." The forms regarded as parasitic are illustrated in a coloured plate. Seidelin's paper is followed by D. Thomson's Report on the Examination of the Blood of Twenty-Five Normal Guinea-pigs for the Presence of Seidelin Bodies. From the guinea-pigs, obtained in England, bodies resembling these were found in all but four. After examining marked blood-films sent home by Seidelin Thomson writes:—"Nearly all of the bodies shown in his specimens are more indefinite than I had imagined they would be, and in fact, in my examination of normal guinea-pigs' blood, I have seen several such bodies, but have passed them over as artefacts and too indefinite to paint."

Thomson indicates their probable sources. There is a coloured plate of the stained objects which may be compared with Seidelin's. In a further Report from Seidelin on the subject of his earlier one he describes observations on guinea-pigs which were inoculated on board ship from the former series and brought home to Liverpool; some were sent to Sir W. LEISHMAN.

The next paper, a Report on some Histological Lesions observed in Laboratory Animals infected with Yellow Fever, is by the same author. It is illustrated by beautiful coloured plates.

Connal and Johnston write of Natural Infections in Guinea-pigs, of which 153 were observed; 36 pages of temperature charts are given. No very definite conclusions were reached.

Lastly, Major D. S. Harvey reported on the Examination of Normal and Inoculated Guinea-pigs. He gives figures from stained blood films of 25 normal English guinea-pigs, of inoculated guinea-pigs, of guinea-pigs inoculated with blood of normal guinea-pigs, and of West African "infected" guinea-pigs.

[After a perusal of these reports one has a vivid sense of the difficulties of the problems which the investigators were called upon to solve. When should and when should not the presence of malarial parasites be held to justify a diagnosis of malaria? The investigators seem to differ in their views. What is the significance of albuminuria in West African fevers? Possibly a careful study of the urine in fevers in another part of Tropical Africa free from yellow fever, say the East Coast, would be instructive. We seem to know very little, about the causes of infantile mortality of native races in West Africa, and yet the subject has great importance. It is clear that in West Africa the association of albuminuria, jaundice, and a raised temperature need not mean yellow fever. What seems to be wanted above everything is a clinical test for the disease.]

A. G. B.

d'ANFREVILLE (L.). *La fièvre jaune et le Maroc*.—*Bull. Soc. Path. Exot.* 1915. Dec. Vol. 8. No. 10. pp. 732-733.

This is a short paper dealing with the possibility of introduction of yellow fever into Morocco. The author points out that he has found *Stegomyia fasciata* in many coast districts, and estimates that it exists in the proportion of 25 to 50 per cent. of all mosquitoes captured by him. The author ascribes the freedom of Morocco from yellow fever to an absence of ports where ships can come nearer to the shore than a mile. He points out that the completion of the ports of Casablanca, Mazagan, and Rabat will permit vessels to come alongside the quays and that then infection may be introduced, notably from Senegal (French West Africa)—a three or four days' voyage.

E. J. W.

COMMONWEALTH OF AUSTRALIA. Quarantine Service Publication No. 6. 95 pp. Illustrated. 1915. Melbourne: Government Printer.—**Australia and Yellow Fever.**

This is a compilation of the important facts (together with an estimate of their significance) bearing upon the question of the introduction of yellow fever into Australia as a result of the opening of the Panama Canal.

The publication is divided into four sections which, with their respective authors, are as follows:—

1. The Danger of the Introduction of Yellow Fever into Australia. By J. H. L. CUMSTON, Director of Quarantine.

2. Clinical Diagnosis of Yellow Fever. By A. BREINL, Director of the Australian Institute of Tropical Medicine.



3. Report of Survey of the Distribution of *Stegomyia fasciata* in the Ports of Queensland. By F. H. TAYLOR, Entomologist to the Australian Institute of Tropical Medicine.

4. The Recorded Occurrence of *Stegomyia fasciata* in Australia and New Guinea. By F. H. TAYLOR.

1. This part of the subject is very fully dealt with and occupies nearly half the publication. The author quotes various authorities who have drawn attention from time to time to the possibility of Australia becoming infected by yellow fever and to the increase of this risk consequent upon the opening of the Panama Canal. An account is then given of the geographical distribution of the disease. A map of the world on Mercator's projection is included, showing those countries differentially coloured in which yellow fever has occurred, and in which it is endemic [but see footnote].\* The places adjacent to Australia in which *Stegomyia fasciata* has been found are also specially coloured.

The combative measures which have been adopted in the infected countries are discussed. It is concluded from the information "concerning those countries where yellow fever exists . . . that it would be fatal to assume that in any of those countries such precautions are taken continuously and consistently as would effectually prevent the infection of ships lying within the ports. In some of the countries some such precautions are taken, but in considering the danger to Australia, any assumption that such precautions are in themselves sufficient guarantee of protection to Australia would be unjustifiable." The question of the possible transmission of infected mosquitoes from a yellow fever country to Australia is then considered, the conclusion being that such transmission "is not only a possibility but constitutes a distinct danger." Investigations in Queensland concerning the distribution of *Stegomyia fasciata* show that it is present in the principal coast towns and that it is "sufficiently prevalent . . . to permit of the rapid spread of yellow fever if it were introduced."

There next comes under review the question of the distribution of *Stegomyia fasciata* in the surrounding countries from which the disease might be "relay"-ed into Australia.

The conclusion to this section is as follows :—

"The greatest danger at present is from the endemic foci on the Pacific coast of America. The opening of the Panama Canal will bring other foci

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\*In the U.S. Public Health Reports, December 5th 1913, p. 2637, a table of the occurrence of yellow fever in 1913 appeared (Foreign Reports), in which under heading British East Africa two cases of that disease were attributed to Kisumu, 25 to Mombasa, and one to Nairobi. This table reappeared on December 12th, p. 2707, on December 19th, p. 2785, and on December 26th, p. 2858. In the number for January 9th, 1914, p. 88, the following footnote was published:—Report of plague in British East Africa erroneously entered as yellow fever on page 2858, Vol. 28—and the foot-note was repeated on page 1718 of the same volume. Meantime however the original entry had been copied into Public Health Bulletin (U.S. Public Health Service) No. 64, page 17, and indicated on the "quarantine map of the world" and it now reappears in the map which illustrates the publication under review, where British East Africa shares with Central America, the northern half of South America and West Africa, the distinction of being painted red. Doubtless we shall next meet with the statement in text-books; it is hardly to be hoped that correction will ever catch it up. In point of fact yellow fever has never been reported from British East Africa.—[Ed.]

within range of Australia, but the greater distance of these foci from Australia, and the care that will be exercised by the United States authorities over vessels passing through the Canal zone combined also with the local control exercised by the authorities in those countries from which trade to Australia will be most probable, will, to a certain extent, reduce the risk.

"The possibility that yellow fever may be carried to Australia direct from these endemic foci must be recognised, and this danger is sufficiently real to justify all precautionary measures against vessels arriving in Australia from these places. A greater danger, however, exists by reason of the prospect of one of the ports adjacent to Australia becoming infected and acting as a relay station for Australia.

"The prevalence in large numbers of *Stegomyia* in the northern ports of the eastern coast of Australia permits of the rapid spread of the disease if introduced, and one of the serious aspects of the question is that epidemics of yellow fever frequently commence with a series of mild cases, the nature of which may be overlooked.

"The fact that the trade with Queensland and America has already increased, and shows signs of still further increase, combined with the ascertained fact of the great prevalence of *Stegomyia* in that State, point to the obvious necessity of doing all that can be done to anticipate or prevent any possible outbreak. It is obvious that if the *Stegomyia* population in any port were to be reduced to a vanishing point, as has been done in the Panama Canal zone, nothing need be feared even if cases were actually introduced, but *per contra*, so long as the mosquito population is allowed to remain unchecked, any undetected introduction of the disease is a potential starting point for a serious epidemic.

"The loss of life, and the dislocation of commerce and shipping that would result from the occurrence of an epidemic of yellow fever might easily become a very serious matter, and notwithstanding the utmost care given by the Quarantine Service, an infected mosquito might escape and be sufficient to commence such an epidemic.

"In view of all these facts the proposal put forward by James that there should be an Intelligence Officer, trained in sanitary administration, stationed at Panama to act as an outpost for Australia and Asia is worthy of the warmest support [see this *Bulletin*, Vol. 3, p. 179].

"In addition to this officer it would become advisable that the New Zealand and Commonwealth authorities should combine and station an officer in Samoa or Tahiti, should it appear as time goes on that vessels coming to Australia or New Zealand, from America are making these places regular ports of call.

"The most important aspect of the yellow fever question, so far as Australia is concerned, is that all steps should be taken to reduce the local mosquito population. Australia is, at the present time, in precisely the condition ironically described by Agramonte in referring to the American States. He says that:—

"These depend almost exclusively upon quarantine measures to prevent the introduction of yellow fever. The bugbear of the Southern States of America is yellow fever, and their protective mainstay is quarantine, the least useful measure which may be implanted in any country for its defence against this infection.—

"This is a very undesirable condition of affairs, and no sort of security will be possible until the greatest possible reduction of *Stegomyia* mosquitoes in the coastal districts, and provision of effective means for limiting introduced infection, render the spread of yellow fever impossible."

2. This section consists of a short clinical description of the disease for the benefit of Quarantine officers who may be called upon to make a diagnosis. The following statement is of importance [the italics are the author's]:—

"Even in the earliest cases, small capillary injection is noted about the teeth in the same position where the lead line appears in lead poisoning. The mucous membrane of the cheek is injected, and on the floor of the mouth, around the attachment of the tongue, minute red spots are seen.

*This condition of the mouth is hardly ever seen in any other fever and is rarely absent in cases of yellow fever, and can, therefore, be regarded as pathognomonic."*

3. This section contains the results of the survey of the chief coastal towns of Queensland, made in 1914, with the object of determining the distribution of the *Stegomyia fasciata* mosquito and show it to be abundant on this coast. A number of photographs illustrate the author's investigations.

4. No organised mosquito survey of Australia and New Guinea has yet been attempted, so that, in this short section, which consists of a record of disconnected observations, the information conveyed is necessarily incomplete.

E. J. W.

CARTER (Henry R.). **Immunity in Yellow Fever.**—*Trans. Soc. Trop. Med. & Hyg.* 1915. July. Vol. 8. No. 8. pp. 279-282.

The author produces some evidence in favour of permanent immunity from yellow fever after one attack. The Plant steamship line brought passengers from Havana to Florida, Key West and Tampa, a journey of 7 and 24 hours respectively. There was no bar to any passengers "immune to yellow fever by previous attack or ten years' residence in an endemic focus." Taking only the 28 quarantine weeks April 15th to November 1st, during nine years at least 6,300 people came in this way, and they came in hot weather to towns in which *Stegomyia* were abundant and where people susceptible to yellow fever were abundant also. If then a considerable proportion of them were infective to *Stegomyia*, their advent should have resulted in outbreaks of yellow fever. This was not the result, so one must conclude that no considerable number were capable of infecting *Stegomyia*. During this period approximately 225 people, who had not had yellow fever, from Havana gave twelve cases of yellow fever, every one of which would have been infective to *Stegomyia*. These 225 people if admitted to Florida would undoubtedly have introduced the disease, whereas the 6,300 which were admitted on account of their immunity did not introduce it. As the author remarks, the evidence is a negative one, but negative evidence is convincing in proportion to its mass.

C. M. W.

HERNÁNDEZ FAJARDO (Diego). **Formas benignas de la fiebre amarilla. Su importancia.** [The Importance of Mild Forms of Yellow Fever.]—*Rev. Med. de Yucatan.* 1914. June. Vol. 9. No. 8. pp. 169-173.

A short paper pointing out that yellow fever may exist for a series of years in a locality in a such mild form that cases of it may be, and commonly are, mistaken for something else. The disease described by GRALL and CLARAC\* as occurring in the Antilles and French Guiana under the name of inflammatory fever, is probably, in the author's opinion, a larvate form of yellow fever.

J. B. Nias. .

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\*GRALL (Ch.) & CLARAC (A.). *Traité Pratique de Pathologie Exotique.* Vol. 3. 1912. Paris: J. B. Bailliére et Fils. *Fièvre jaune*, by CLARAC and SIMOND, pp. 61-64.

**MACFIE (J. W. Scott). Arneth Counts in Yellow Fever.—***Jl. Trop. Med. & Hyg.* 1916. Feb. 15. Vol. 19. No. 4. pp. 41-45. With 4 charts.

This paper embodies the results of the examination of the polymorphonuclear leucocytes by the method of ARNETH in 19 definite cases of yellow fever, fourteen of which occurred in Guayaquil, Ecuador, and five in West Africa.

The American cases, at the period of the disease when they came under observation, showed a profound shift to the left of the Arneth count, the index being, as a rule, not less than 90.0.

In the West African cases, two of which were mild, there was also this well-marked deviation to the left.

"In fatal cases, so far as can be judged from the materials examined, the Arneth index either remains very high, or mounts still higher as the disease progresses.

"In cases that recover, on the other hand, the index, after remaining high until about the seventh day, begins to fall rapidly and reaches a figure approximating to the normal about the tenth to the fifteenth day. In this respect yellow fever appears to differ from malaria (*P. falciparum* fever), for in the latter disease, in the few cases that have been examined on a number of successive days, the deflexion of the Arneth count has been observed to persist somewhat longer.

"It is probable that there is nothing actually specific about the changes in yellow fever, and it may perhaps be anticipated that a similar profound shift to the left of the Arneth count will be found to be present in the early stages of other acute conditions accompanied by high fever and profound toxæmia, such, for instance, as plague, etc. In the majority of such diseases, however, even in the early stages, there will be other signs and symptoms to aid the diagnosis; but in yellow fever in the mild attacks, and in the initial stages of the more typical forms of the disease, these are, unfortunately, often absent or of a negative character, and it is in such cases that the Arneth count may be of assistance in determining the nature of the infection."

The author explains the change in the index in yellow fever on the hypothesis that the cells to the right of the count, which he considers are probably the older and less resistant, are destroyed by the toxæmia. In this way the leucopenia of the early stages of the disease is caused, and the shift to the left in the count is produced. He finds support for his hypothesis in O'BRIEN'S observations (1914) of an acute degeneration of the polymorphonuclears in yellow fever. The continuance of the shift to the left after the disappearance of the leucopenia he explains on the assumption of an increased activity of the leucopoietic system, with the production of a correspondingly large number of young polymorphonuclear leucocytes.

E. J. W.

**CROPPER (John Westray) & DREW (Aubrey Howard). The Occurrence of Bodies resembling "Seidelin Bodies" (*Paraplasma flavigenum*?) in Anaemic and Foetal Blood, with some Remarks on their Probable Nature.—***Jl. Trop. Med. & Hyg.* 1916. Jan. 15. Vol. 19. No. 2. pp. 20-24. With 1 plate.

At the request of the Yellow Fever Commission (West Africa) a search for Seidelin Bodies was made by one of the authors in the blood of anaemic adults and children resident in England. In the blood of 102 persons (70 per cent. of whom suffered from anaemia) he

found only five definite bodies; these occurred in children with a moderate degree of anaemia. Both authors continued the investigation, acting on the suggestion of WENYON and Low that "a further study of the exact nature of these bodies would be of interest with a view to determining whether they are developmental or degenerative in origin." They state that they have also recently been able to confirm WENYON and Low's results by finding the bodies in the blood of foetal guinea-pigs.

Their "examination showed the presence of bodies resembling Seidelin bodies, and the relative frequency of their occurrence in blood from different sources, to be as follows. (The cases marked with an asterisk are quoted from the Report to the Yellow Fever Commission already referred to):—

Source of Blood.	Number of Cases.	Number of Cases containing Seidelin Bodies.		
		Positive.	Doubtful.	Negative.
Adults, and children (all ages). Not anaemic ..	26	—	4	22
Adults, and children (all ages). Not anaemic ..	34*	—	—	34
Adults, and children above 5 years of age. Anaemic ..	12	3	3	6
Adults, and children above 5 years of age. Anaemic ..	47*	1	5	41
Children under 5 years of age. Anaemic .. ..	12	1	1	10
Children under 5 years of age. Anaemic .. ..	21*	3	—	18
Pernicious anaemia ..	1	1	—	—
Human foetus .. ..	8	8	—	—
New-born kittens .. ..	6	6	—	—

"The features brought out by this table are that, while no Seidelin bodies could be found in the blood of sixty persons without obvious anaemia, and only eight definite bodies in ninety-two cases of ordinary anaemia, slight and severe, yet in the case of pernicious anaemia and foetal blood every sample contained them. Since on the average three blood-films were made from each case, the search for Seidelin bodies in ordinarily anaemic human blood involves the scrutiny of every cell in thirty to forty blood-films to find a single specimen. This scantiness, in comparison with the number present in foetal blood, is very striking."

The authors describe in detail the technique used by them and various fallacies that may arise unless the greatest care is exercised. They consider that the bodies are undoubtedly non-parasitic and that their probable mode of formation is by nuclear absorption. For the detailed discussion of their views as to the nature of the bodies the original paper must be consulted. Suffice it here to say that the blue staining matter in the bodies is regarded as the remnants of the degenerating nucleus. The red staining granules of the bodies are held to be centrosomic in nature, this opinion being based upon the work of E. H. Ross in 1911, and upon the authors' own confirmation of his experiments.

Their conclusions are as follows :—

“(1) The blood in pernicious anaemia and that of the human foetus and of new-born kittens contains bodies which appear identical with Seidelin bodies (*Paraplasma flavigenum*, the so-called parasite of yellow fever).

“(2) The bodies are apparently absent in the blood of normal and ordinarily anaemic adults. They may rarely be found in the blood of anaemic children.

“(3) The bodies are the remnants of the nuclear degeneration (Schilling-Torgau) which takes place in the conversion of the erythroblast into the normal non-nucleated red corpuscle.

“(4) The red-staining granules are readily demonstrated by the jelly method of *in vitro* staining and are probably centrosomes.”

E. J. W.

SEIDELIN (HARAK<sup>1</sup>). **The Histology of the Liver in Yellow Fever.**—*Yellow Fever Bureau Bull.* 1915. Aug. 30. Vol. 3. No. 4. pp. 269–296. With 2 plates.

In this paper the author describes in detail the histological changes in the liver in yellow fever. Two coloured plates of colour microphotographs illustrate the lesions he has found. Without going into details the author's conclusions may be mentioned, which are these. So far no pathognomonic characters have been proved to exist in yellow fever liver, but at the same time a careful histological examination of the organ may be a factor of very great importance in diagnosis. In early cases hyperaemia may obscure the fatty changes and in such cases the demonstration in sudan-stained sections of considerable quantities of fat is a very strong argument in favour of yellow fever, as in early stages of other infectious diseases the liver shows more cloudy swelling than fatty change. In more advanced cases, where the fatty change is manifest to the naked eye, disorganization of the tissue, diffuse but somewhat irregularly distributed necrosis, mid-zonal necrosis, apparent increase of stellate cells and accumulation of fat-containing pigment are the characters to be looked for. All these phenomena may be observed in sections prepared by the freezing microtome, a detail of no small importance where rapid diagnosis is required. Those who are interested in the subject will have to consult the original for greater detail.

C. M. W.

CONVERSE (G. M.). **The Control of Yellow Fever in an Immune Community without the Use of Fumigation.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1915. Vol. 3. No. 5. pp. 289–297.

The paper describes a campaign against yellow fever in the Peruvian town of Iquitos, which is on the Amazon river 2,300 miles from the Atlantic Ocean and 4 degrees from the Equator. The author describes the difficulties he had to overcome, due to the ignorance of the population and the poorness and expense of labour owing to a universal hook-worm infection. Lack of funds prevented any very elaborate or extensive scheme, so that the campaign was limited to what is described as a general “clean up.” The town was one of 13,000 inhabitants who lived in 3,059 houses, located in some 160 square blocks and containing 968 wells, 569 water tanks, 3,000 water barrels, 733 latrines, 8,119 water jars, 200 canoes or launches on shore or at

the wharves, some 14 kilometres of roof gutters for the collection of rain water, and such other water containers as were formed by accumulations, lasting through many years, of empty tins, bottles, etc., in every house, garden and vacant lot in the community. Other than a general clean up not a single thing was done except those measures directed exclusively against the larva of *Aedes calopus* and not a single change in sewage, water supply or condition of the streets. In the course of a few months the mortality dropped from 49.52 to 28.88 per thousand and a further intensive campaign against the hook-worm has brought about a further reduction to 21 per thousand.

Iquitos is a town in which yellow fever has been present year in year out since its foundation thirty years ago and the frequency of yellow fever is shown by the 1912 figures of 273 deaths of persons between 15 and 30 years of age, of whom 119 were certified as having died of yellow fever.

C. M. W.

SERGEANT (Ed.). **Hypothèse émise en 1821 sur la nature infectieuse de la Fièvre jaune et sur sa transmission par des Insectes.**—*Bull. Soc. Path. Exot.* 1915. July. Vol. 8. No. 7. pp. 467-469.

In 1821 the French Government sent three investigators, BALLY, FRANÇOIS and PARISSET to inquire into an epidemic of yellow fever in Catalonia, especially at Barcelona. The results were published in a large volume which appeared in 1823.\* The interesting point brought forward by the author is that the writers of the book advised fumigation of the vessels, not so much with a view to purifying the air but to dislodge the numerous vermin which hid in inaccessible places on board and which they considered responsible for the spread of yellow fever.

C. M. W.

\*BALLY, FRANÇOIS & PARISSET. *Histoire médicale de la fièvre jaune observée en Espagne et particulièrement en Catalogne, dans l'année 1821.*—664 pp. With 2 charts. 1823. Imprimerie royale.

## PELLAGRA.

SILER (J. F.), GARRISON (P. E.) & MACNEAL (W. J.). **Prognosis in Pellagra. A Preliminary Note.**—*Proc. New York Path. Soc.* 1915. Mar. N. Ser. Vol. 15. No. 3. pp. 30-34.

A preliminary report relating to the prognosis in pellagra with regard to the death-rate in the first year of the disease, the liability of the survivors to a recurrent attack in after years, and the death-rate in recurrent attacks. The influence on the prognosis, of race, sex and age is also indicated.

From a study of 1,162 cases of the disease, it appears that the death-rate in the year of the initial attack is about 14 to 15 per cent. Records taken from the initial attack in the case of 697 patients show 1,037 instances of recurrence in after years, and 591 instances of freedom from recurrence, "indicating roughly that those who survive one attack of pellagra have about one chance in three of escaping an attack of the disease in the following year." Taking the patients who showed no signs of recurrence for at least two years after their initial attack as "recoveries," the rate obtained for recovery after one attack was 12·8 per cent. The gross death-rate in the year of recurrent attack is not very different from that of the initial attack and amounts to about 12·5 per cent. of the cases. The negro race shows a much higher death-rate from the disease than does the white race; on the other hand the negro is much less liable to be attacked by the disease. The death-rate from pellagra is somewhat higher in males than in females but chronic recurrent attacks are more frequent in females. Generally speaking the percentage of deaths increases with age, the prognosis in children being relatively good.

[The observations were made from cases occurring in Spartanburg County, South Carolina.]

H. Maclean.

NESBITT (Charles T.). **Sanitation and the Control of Pellagra.**—*Jl. Amer. Med. Assoc.* 1916. Feb. 26. Vol. 66. No. 9. pp. 647-648.

Statistical observations are given to show "that the incidence of pellagra is not decreased by improved sanitation and general disease prevention methods and that it is materially increased by business depression and increased prices of food."

These observations refer to the city of Wilmington, N.C., where as the result of general hygienic improvements the death-rate from general causes has steadily decreased, while that from pellagra has advanced.

The following figures illustrate this:—

Year.	Comparison of General Death Rates.		Comparison of Death Rates from Pellagra.	
		Per 1,000.		Per 100,000.
1911	..	29·43		38·83
1912	..	21·46		21·38
1913	..	19		16·69
1914	..	18·62		38·26
1915	..	16·40		64·60

H. M.



HOLMES (William H.) **Remarks on *B. Welchii* in the Stools of Pellagrins.**—*Arch. Intern. Med.* 1916. Mar. 15. Vol. 17. No. 3. pp. 453-458.

A paper written with the object of directing attention to the fact that abnormally large numbers of organisms belonging to the *B. Welchii* group have been found in the stools of pellagrins, and to enquire whether these organisms may not bear some relationship to the disease. It is pointed out that diarrhoea is always a marked symptom in pellagra. The pellagrins in which this bacillus was found were living on a diet rich in carbohydrates but deficient in protein especially of animal origin. In the presence of high carbohydrate diet the *B. Welchii* has been found to produce diarrhoea in children and adults. This diarrhoea can be cured by a diet of protein and buttermilk. GOLDBERGER prevented pellagra by the addition of proteins and buttermilk to the diet, while he produced pellagra experimentally by means of a high carbohydrate diet. Though it is not known whether the *B. Welchii* was present in large number in GOLDBERGER'S experiments, it is yet worth further investigation to ascertain whether or not this organism plays any part in the etiology of pellagra.

H. M.

SYDENSTRICKER (Edgar). **The Prevalence of Pellagra. Its Possible Relation to the Rise in the Cost of Food.**—*U. S. Public Health Rep.* 1915. Oct. 22. Vol. 30. No. 43. pp. 3132-3148.

A statistical review of the economic conditions and their effect on the quantity and nature of the diet in different parts of the United States. It is suggested that the prevalence of pellagra in certain districts may, probably, be dependent on the nature of the food supply, which in turn is directly related to the special conditions operating in the different districts.

H. M.

GROTE (Carl A.). **Pellagra. Diet as the Essential Element in its Cause and Cure.**—*Southern Med. Jl.* 1916. Mar. Vol. 9. No. 3. pp. 227-229.

From evidence obtained in Walker County the author arrives at the following conclusions concerning the etiology of pellagra :—

- " 1. Well nourished people do not have pellagra.
- " 2. The diet of our backward farmers, and farmers who have moved to the mining camps, has undergone a serious deterioration in nutritive value during the past few decades.
- " 3. In our cases of pellagra there is the sameness of diet, excessive in carbohydrate and deficient in nitrogenous elements.
- " 4. Pellagrins as a class do not own cows, consequently are deprived of milk.
- " 5. A well balanced nutritious diet, in addition to almost any medical treatment with its psychic effect, will cure most cases of uncomplicated pellagra."

H. M.

GREEN (E. M.). **Pellagra Investigations in the Georgia State Sanitarium for the Insane.**—*Southern Med. Jl.* 1916. Mar. Vol. 9. No. 3. pp. 230-231.

An account of the result of GOLDBERGER'S experiments [see this *Bulletin*, Vol. 7, pp. 51 and 52]. The author asserts that these experiments "have proved beyond doubt that the employment of suitable diet alone may bring about the recovery of cases not too far advanced and that it will prevent, for a time at least, recurrences of this disease."

H. M.

MOORE (H. Leslie). **Pellagra Commission of Dallas Medical and Surgical Society. Report of Committee on Prevention and Treatment.**—*Southern Med. Jl.* 1916. Jan. Vol. 9. No. 1. pp. 16-17.

A statement of the results arrived at by a committee appointed "to investigate the literature, to talk with those who have been devoting a great deal of time and study to this subject and to present some conclusions." The conclusions arrived at are that the most likely cause of pellagra is to be found in deficient diet, and that this theory has been very materially strengthened by the experiments of Dr. GOLDBERGER [see this *Bulletin*, Vol. 7, pp. 51 and 52].

Dr. GOLDBERGER'S suggestions as to diet are recommended.

H. M.

ALLISON (W. L.) **Pellagra Commission of Dallas Medical and Surgical Society. Report of Committee State-at-Large.**—*Southern Med Jl.* 1916. Jan. Vol. 9. No. 1. pp. 17-20.

In the report of a committee appointed to study and investigate pellagra, the following observations are made. The disease came to Texas from Italy. There is no evidence that pellagra was present in Texas prior to 1906; since then it has spread largely through all the southern states of America. The disease is not directly contagious and deficient diet is probably a pre-disposing factor, but will not account for cases present in well to do people, which are fairly common in Texas, nor explain its sudden incidence and rapid increase in the country. The fact that mild cases sometimes refuse to respond to a well-balanced diet further strengthens the view that the cause is not entirely dietetic. Pellagra seems to be an infection and an insect borne disease. Heredity appears to play no part in its etiology. It is more common in women than in men, and morphine habitués seem to be especially susceptible. Various suggestions as to treatment are discussed.

H. M.

LEHMANN (John R.). **Report of Pellagra Clinic held in Dallas, Texas, in Connection with Meeting of the Southern Medical Association, November 8-11, 1915.**—*Southern Med. Jl.* 1916. Jan. Vol. 9. No. 1. pp. 42-44.

A report of a pellagra clinic in which several points dealing with the etiology and treatment of pellagra were discussed. In Texas the annual death-rate due to pellagra is about 500, while the number of cases amounts to from forty to fifty thousand.

H. M.

DEARMAN (W. A.). **The Further Consideration of the Etiology of Pellagra with Reference to Amebic Invasion.** *Southern Med. Jl.* 1916. Jan. Vol. 9. No. 1. pp. 24-29.

The author discusses the amebic and deficient diet theories of pellagra and comes to the conclusion that GOLDBERGER's results [see this *Bulletin*, Vol. 7, pp. 51 and 52] supporting the deficiency idea are not final. He suggests that the disease is probably due to amebic invasion. As an offset against GOLDBERGER's conclusions the author quotes the report of the Thompson MacFadden Commission in which it is stated that an outbreak of pellagra in the State hospital at Peoria, Ill., was successfully controlled by isolation of the patients and enforcement of general cleanliness "without any change in the dietary as far as we have any record."

H. M.

BEALL (K. H.). **The Epidemiology of Pellagra.**—*Texas State Jl. Med.* 1915. Sept. Vol. 11. No. 5. pp. 268-271. With 3 figs.

A survey of the epidemiological features of pellagra in the state of Texas. The effect of race, age and sex on the incidence of the disease is discussed. The author maintains that pellagra in Texas is seen more often in females than in males and is unable to reconcile this difference with the diet deficiency theory. If the disease depended on diet, then men and women eating the same kind of food should show the same incidence of the disease.

BEALL (K. H.). **Pellagra in Texas.** *Southern Med. Jl.* 1916. Jan. Vol. 9. No. 1. pp. 20-21.

A survey of the incidence of pellagra in Texas. The disease was first diagnosed here about eight years ago and at that time was so rare as to be of merely academic interest. Within the last eight years, however, it has increased to an enormous extent and is now responsible for many deaths. Certain aspects of the disease are discussed.

H. M.

PARRISH (C. C.). **Some Facts bearing on the Cause of Pellagra.**—*Texas State Jl. Med.* 1916. Jan. Vol. 11. No. 9. pp. 487-488.

A discussion of the probable etiology of pellagra. The view held is that pellagra is an infection, and that the infection is communicated through the medium of the soil surrounding the household.

H. M.

PARRISH (C. C.). **The Soil as a possible Medium for the Etiological Factor of Pellagra.**—*Southern Med. Jl.* 1916. Mar. Vol. 9. No. 3. pp. 229-230.

A paper advocating the view previously expressed by the author that pellagra is probably caused by some ultra microscopical germ in the soil of the yard or garden surrounding the habitations of pellagrins. It is pointed out that little or no pellagra is present in cities where people are not exposed to the soil, whereas in rural districts where

the sanitary arrangements are often of a crude kind the greatest proportion of the disease is found. The author maintains that throughout the history of the scourge all writers are agreed "that workers in the earth living in rural districts are almost exclusively the class of people affected."

H. M.

PAGE (B. W.). **Etiology of Pellagra.**—*Med. Record.* 1915. Nov. 13. Vol. 88. No. 20. Whole No. 2349. pp. 826-827.

The author claims to have isolated a special organism from the faeces of pellagrins. This organism he observed in more than 600 specimens of faeces from cases of pellagra, while in six normal stools examined, the results were negative.

"One of the several healthy persons previously examined with negative results, after accidental exposure in a laboratory, developed symptoms of gripe which later proved to be pellagra. The organism was isolated from the stool on the third day after symptoms developed. The organism was again isolated from the stool eight and twelve months later. Symptoms of the disease still exist."

Some special features in connection with the morphology, cultivation and growth of the organism are given.

H. M.

SILER (J. F.). **Medical Notes on Barbados, British West Indies Part II. Pellagra in Barbados.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1915. Oct. Vol. 3. No. 4. pp. 186-221. With 3 maps & 1 chart.

An investigation into the conditions of life and prevalence of pellagra in Barbados. In general, the sanitation is primitive and soil pollution is universal. Most of the corn used is kiln-dried and imported from the United States; there is no evidence that the amount of corn meal used now is more than was used 30 years ago and the general diet seems to be the same as that eaten by former generations. This is interesting in view of the fact that pellagra has enormously increased within the last twelve years, and suggests that diet hardly accounts for the disease. The geographical distribution of pellagra showed marked inequalities which could not be accounted for, as it did not seem to depend on differences in diet or other conditions. The author suggests "that pellagra is an infectious disease communicated from person to person, possibly through contamination of food with the excretions of pellagrins."

H. M.

SILER (J. F.). **Medical Notes on Jamaica, British West Indies. Part II. Pellagra in Jamaica.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1916. Mar. Vol. 3. No. 9. pp. 481-499. With a map & 2 figs.

A very full account of the history, prevalence and geographical distribution of pellagra in Jamaica. In collecting this information, the author kept in view the three most plausible theories as to the etiology of the disease—deficiency, intoxication and infection. The most interesting observations made were as follows:—

Pellagra was found to be plentiful in two institutions on the island—the Lunatic Asylum and Manning Home—but was very rare elsewhere.

Although many charity hospitals have been erected in different parts of the island for the care and treatment of indentured labourers, only two suspected pellagrins were found in these institutions. Pellagra was also not present to any extent in the district almshouses. The disease has occurred in endemic form in the Jamaica Lunatic Asylum for many years, and "the specific agent causing the disease is unquestionably active at this institution, as many of the inmates had not acquired the disease until several years after commitment." Although the diet seemed to be lacking in fresh meat, it appeared to be more varied and better balanced than the diet used by the general inhabitants of like class. The diet of the native population of Jamaica is poor, and if deficient diet were the cause of pellagra the disease might be expected to be very common on the island. This however was not the case. The distribution of pellagra in Jamaica is "very suggestive of a low grade infection in which poor nutrition plays an important part as a predisposing factor." No evidence in support of SAMBON'S Simulium theory could be obtained.

H. M.

MCDONALD (W. M.). **Notes on Pellagra.**—*Jl. Trop. Med. & Hyg.* 1916. Jan. 15. Vol. 19. No. 2 pp. 17-20.

A short review of pellagra in which the author comes to the conclusion, as the result of personal observations in Antigua and a study of the literature, that the cause of pellagra is a deficient or ill-balanced diet. Contrary to the statements of certain observers the author maintains that the intensity of the skin lesions bears a definite relationship to the severity and progress of the disease.

H. M.

JADASSOHN (J.). **Ueber den pellagrösen Symptomkomplex bei Alkoholikern in der Schweiz.** [On the Symptoms of Pellagra occurring in Alcoholics in Switzerland.]—*Correspondenz-Blatt. der Schweiz. Aerzte.* 1915. Vol. 45. No. 52. pp. 1641-1654; 1916. Jan. 1. Vol. 46. No. 1. pp. 15-26.

The first publication gives a detailed account of four cases of obscure illness seen at the author's clinic, which he diagnosed as pellagra; in three of these a well-marked history of alcoholism was obtained, and in the fourth case, though no such history was at first forthcoming, it was subsequently ascertained that the patient was a heavy drinker. The author agrees that alcohol can of itself give rise to symptoms which may to a certain extent simulate pellagra, and make a differential diagnosis exceedingly difficult. In this connection MERK'S monograph (Innsbruck, 1909) is quoted, and the various points raised by MERK are discussed and criticised. MERK'S suggestion, that cases with symptoms of pellagra arising in alcoholics may not be true pellagra but "pseudopellagra" is considered, but the idea of such a pseudopellagra accounting for the symptoms present in the author's cases is rejected. For various reasons, fully indicated in the paper, he maintains that they were undoubtedly cases of true pellagra. This association of alcoholism with pellagra suggests the possibility that alcohol may play a part in the etiology of the disease. No connection between maize diet and pellagra could be established in any of the cases.

In the second publication the etiology of pellagra is further discussed and the various theories considered. It is pointed out that pellagra may be divided into three classes of cases.

(1). The well-known outbreaks of pellagra in which large numbers of people are affected. Such outbreaks are common in Roumania and Italy. Here maize almost certainly plays some part.

(2). Sporadic cases sometimes arising in patients who are well off and have abundance and variety of good food. These cases are often associated with alcoholism.

(3). The endemic form occurring in various institutions.

Assuming that alcohol may play some part in causing the disease, the suggestion is made that alcoholism may only produce pellagra when the alcohol is made from maize or bad maize. Such an idea has been advanced by LOMBROSO, and NEUSSER points out that in Roumania spirit is often made from maize so spoiled as to be unfit for animal consumption. Here pellagra has recently made rapid strides, and since Roumanian "schnapps" is exported to all European states, sporadic cases might thus be accounted for.

It is proved that all the cases mentioned in the first paper might have obtained alcohol made from maize, since during the last few years maize has been used in Switzerland for the distillation of spirits. The author inclines to the view that alcohol made from spoiled maize may really constitute a large factor in the etiology of pellagra, and recommends the necessary countermeasures.

H. M.

GALLI-VALERIO (B.). *Zur Frage der Pellagra in der Schweiz.* [Pellagra in Switzerland.]—*Correspondenz-Blatt d. Schweiz. Aerzte.* 1916. Feb. Vol. 46. No. 6. pp. 181-182.

Attention is drawn to the fact that several cases of pellagra associated with alcoholism have been diagnosed in Switzerland in recent times. The author takes the view that the disease is associated with some defect in diet, and favours the idea that pellagra is the result of toxic products present in spoiled maize. The theory that these deleterious products may be present in the liquors distilled from spoiled fermented maize is favoured.

H. M.

RONDONI (Pietro). *Aleune considerazioni sulla pellagra, la sua oziologia e la sua prevenzione e cura.* [Considerations on Pellagra, its Etiology, Prevention and Cure.]—*Polislinico. Sez. prat.* 1915. Nov. 21. Vol. 22. No. 47. pp. 1569-1572.

A discussion of the etiology of pellagra in which the author inclines to the view that pellagra is a deficiency disease. It is pointed out that the disease though prevalent in maize-eating countries also appears in countries where maize is little used. Pellagra is not necessarily associated with maize, and may appear under conditions of defective diet, irrespective of the nature of the individual articles comprising the diet.

H. M.

SEPPILLI (G.). **L'Opera della Commissione Pellagologica Provinciale di Brescia dal 1 Luglio 1914 al 30 Giugno 1915.** [The Work of the Pellagological Commission of Brescia from July 1st 1914 to June 30 1915.]—*Riv. Pellagologica Ital.* 1915. Nov. Vol. 15. No. 6. pp. 82-84.

The Commission reports that the number of Communes infected with pellagra has diminished from 86 on June 30th, 1914 to 75 on June 30th, 1915. Under the auspices of the Commission a dietetic cure was undertaken in 58 provinces. The system of inspection of maize previously instituted was continued, and efficient arrangements for its drying and preservation were undertaken. Grants were made to pellagrous mothers during gestation and lactation. Educational propaganda was carried out.

H. M.

ALPAGO-NOVELLO (Luigi). **Sulla prima introduzione del grano-turco e la prima comparsa della pellagra nel Veneto, nella Lombardia e specie nel Bellunese.** [On the Introduction of Maize and the First Appearance of Pellagra in Venetia, Lombardy, and especially in Belluno.]—*Riv. Pellagologica Ital.* 1915. Nov. Vol. 15. No. 6. pp. 85-92.

A historical account of the diet of the peasants in the above districts and an attempt to correlate the diet with the incidence of pellagra.

H. M.

GOLDBERGER (Joseph), WARING (C. H.) & WILLETS (David G.). **A Test of Diet in the Prevention of Pellagra.**—*Southern Med. Jl.* 1915. Dec. 1. Vol. 8. No. 12. pp. 1043-1044.

In September 1914, an increase was made in the amount of fresh animal and leguminous foods supplied in the dietary of two orphanages which had served for several years as endemic foci of pellagra. No new case occurred during the following year and only one case of recurrence among 105 pellagrins of the previous year.

Similar observations were made at the Georgia State Sanatorium [see this *Bulletin*, Vol. 7, pp. 51 and 52].

H. M.

WILLETS (David G.). **The Treatment of Pellagra by Diet.**—*Southern Med. Jl.* 1915. Dec. 1. Vol. 8. No. 12. pp. 1044-1047.

An account of 43 cases treated at the Georgia State Sanitarium by a generous dietary rich in protein; of 30 cases, 11 improved, 17 recovered, and 2 died. The author considers these results particularly encouraging in view of the difficulties experienced in dealing with insane patients.

H. M.

WILSON (W. T.). **Drugs in Pellagra.**—*Southern Med. Jl.* 1916. Jan. Vol. 9. No. 1. pp. 21-24.

A paper dealing with the treatment of pellagra and the management of pellagrins. For its beneficial effects, especially on the intestinal symptoms, picric acid is recommended in doses of 1/2 dram of 1 per cent. aqueous solution every six hours; in some severe cases as much as 1 dram may be given. If depression appears the dose must be reduced.

H. M.

SECCOR (Wm. Lee). **Some Observations on the Etiology, Symptomatology and Treatment of Pellagra.**—*New Orleans Med. & Surg. Jl.* 1916. Mar. Vol. 68. No. 9. pp. 580-582.

The author in conjunction with Dr. E. E. PALMER has obtained good results in the treatment of pellagra by the use of "autoserotherapy" [see this *Bulletin*, Vol. 7, p. 62]. Along with this special treatment tonic doses of arsenic are generally of service. Many of the first cases were treated by autoserotherapy without any change in their food, but now the patients are given a well balanced diet, no canned goods being allowed. The authors claim good results in cases where prolonged drug treatment along the usual lines had entirely failed.

H. M.

ALESSANDRINI (Giulio) & SCALA (Alberto). **Risultati di alcune esperienze curative della pellagra col citrato trisodico.** [The Cure of Pellagra by Trisodium Citrate.]—*Policlinico. Sez. prat.* 1916. Jan. 16. Vol. 23. No. 3. pp. 71-76.

In support of the theory that colloidal silica in water may be the cause of pellagra, the authors have carried out experiments to test the effect of intramuscular injections of trisodium citrate on pellagrins. Satisfactory results were obtained.

H. M.

HENDERSON (D. K.). **Pellagra. Report of a Case.**—*Rev. of Neurolog. & Psychiat.* 1915. Dec. Vol. 13. No. 12. pp. 579-586.

A full description of a case of pellagra in the west of Scotland. The patient presented all the typical symptoms of the disease. An interesting point is that she had never been fond of meat and for two years before her admission to hospital had lived practically on tea and bread and butter.

H. M.

PINAULT (L. G.). **Pellagra.**—*Canadian Med. Assoc. Jl.* 1916. Mar. Vol. 6. No. 3. pp. 228-232.

A short account of the symptoms, course and treatment of pellagra. A fatal case in a woman of 22 is recorded; this is said to be the first case of the disease described in Canada.

H. M.



WISE (Fred) & LAUTMAN (M. F.). **Pellagra in New York and its Vicinity ; With Report of Two Cases.**—*Jl. Cutaneous Dis. including Syph.* 1915. Nov. Vol. 33. No. 11. Whole No. 398. pp. 760-764. With 2 plates.

A clinical account of two cases of pellagra in New York where the disease is very uncommon. Only three cases of pellagra indigenous to New York State have been previously recorded.

H. M.

LORENZ (W. F.). **Mental Manifestations of Pellagra.**—*U.S. Public Health Rep.* 1916. Feb. 4. Vol. 31. No. 5. pp. 221-246.

A careful analysis of the nature of the mental disturbances present in pellagra. Cases where there was evidence that the disease was preceded by a previously existing psychosis were excluded. Of cases where no history of previous mental disturbances was present, 167 were investigated and presented symptoms which allowed of a classification under the following types :—

Confused = 84 (51 per cent.)

Delirious = 63 (38 per cent.)

while 16 (10 per cent.) gave a clinical picture that “ resembled either dementia precox (11 cases) and senility or arteriosclerotic dementia (5 cases).”

Since, from the nature of the cases, many more delirious types must be admitted to institutions for the insane than the confused type, it would appear that the delirious type is much less common than the confused type. The average duration of the disease prior to the manifestation of mental disturbances was two years. The shortest period between the onset of mental symptoms and the first definite sign of pellagra as indicated by the dermatitis was 10 days, while the longest period was 20 years. As many as 90 per cent. of uncomplicated pellagrins admitted to institutions for the insane present a mental picture characterised by disturbances of orientation. This is accompanied by such manifestations as “ clouding of the mind, confusion of thought, visual and auditory hallucinations, apprehension, defective retention and a subsequent amnesia restricted to the period of the greater disorientation ; furthermore, the periods of confusion or delirium tend to appear as episodes of varying duration.” Since similar mental symptoms are found in the mental disturbances associated with intoxications and infective or exhaustive states, it is recommended that pellagrous mental states should be regarded as belonging to the group of toxic psychoses. The mental derangement produced by alcohol furnishes a good example of the toxic psychoses and there is a distinct resemblance between this condition and that of pellagra. This is not clinical only, for characteristic axonal degeneration of brain cells is found in both conditions ; according to COLE beriberi gives the same type of lesion. Other clinical manifestations common to alcoholism and pellagra are mentioned. The conclusion arrived at is, that the symptoms present in pellagra are not the result of an infection, but are caused by a toxic substance of a chemical nature similar to alcohol in that it has specific deleterious properties.

[Since beriberi shows certain manifestations of a toxic psychosis, its classification as a toxic disease would be supported by the above conclusions. It is now, however, universally acknowledged that beriberi is a deficiency disease; it is therefore doubtful whether the mental manifestations of pellagra can be safely applied to throw light on its etiology.]

H. M.

BAGLIONI (S.). *Recherches sur les effets de l'alimentation maïdique.*—*Arch. Ital. de Biol.* 1915. Sept. 25. Vol. 63. No. 2. pp. 177-219.

The author describes a series of experiments on feeding with the proteins of wheat, maize and egg, the metabolism being investigated in the usual manner. Egg protein is shown to be the most satisfactory of these substances. Zein and gliadin were less efficient than the mixed proteins of the grains from which they are respectively derived. Complete tables of the author's results are furnished. It is hoped that such investigations will throw some light on the problems of pellagra.

H. M.

YOUNG (Beverly). *The Blood in Pellagra.*—*Southern Med. Jl.* 1916. Jan. Vol. 9. No. 1. pp. 29-31.

As a result of blood examinations in a large number of pellagrins the author concludes that well marked and persistent lymphocytosis is a constant feature of pellagra; this condition is present long after the acute symptoms have subsided. Indeed, in the main, the cases have a higher lymphocyte count after the acute symptoms have passed over than during the acute stage. Since a similar lymphocytosis accompanies other chronic infections such as syphilis and tuberculosis the author suggests that pellagra is also an infection of a chronic nature. Of 39 cases examined 10 gave a positive Wassermann reaction.

H. M.

LAVINDER (C. H.). *The History of Pellagra. Some of the Salient Points.*—*New York Med. Jl.* 1915 Dec. 11. Vol. 102. No. 24. Whole No. 1932. pp. 1169-1172.

An interesting paper dealing with the history of pellagra, especially with regard to the earliest writings on the subject. There is a good deal of evidence advanced by the earlier observers that the disease is not contagious. Thus STRAMBIO, writing towards the close of the eighteenth century, observed that the scales from pellagrins might be eaten with impunity, the same room and bed shared, and even the same spoon used without the disease being contracted. STRAMBIO and his predecessors and contemporaries all held the view that the principal cause of the disease was to be looked for in bad food. Though many different suggestions have been put forward since STRAMBIO's day, we are now practically agreed that the problem of pellagra is definitely associated with incomplete diet, but the exact nature of the deficiency is still obscure.

H. M.

## MISCELLANEOUS.

**BOUILLIEZ (Marc).** Contribution à l'étude et à la répartition de quelques affections parasitaires au Moyen Chari (Afrique Centrale). *Bull. Soc. Path. Exot.* 1916. Mar. Vol. 9. No. 3. pp. 143-167. With a map and 6 text-figs.

*\*Leishmaniasis.*—In August 1915 two natives of Fort Archambault presented themselves with oriental sore. They stated that they had not left their village for a long time; each had two ulcers, situated in one case near the elbow and on the forearm, and in the other on the wrist and knee. *L. tropica* was easily seen in stained smears. Inoculations were made into monkeys and good sores were produced in *Cynocephalus* and *patas*. Geckos and lizards were examined for parasites, but none were found which could have any relation to *L. tropica*, nor did several geckos which were inoculated show any parasite in the blood. It is noted that in this instance a rocky soil, which CHATTON believes to be a feature of tropical sore districts, was not concerned [this *Bulletin*, Vol. 3, p. 557]. The author thinks that this disease is more frequent than appears; he suggests that patients do not present themselves for treatment till the sore has been transformed into a phagedaenic ulcer, which is very common, and in which it is no longer possible to discover the parasites.

*Malaria.*—The author sought to establish the endemic index from the study of blood smears from children under five. Of 916 smears 738 were positive, or 80·5 per cent. The figures vary, but not greatly, for different localities. These figures are compared with those obtained in other parts of French African possessions. An endeavour was made to classify the parasites according to species; it is pointed out that for various reasons the results cannot be regarded as very exact. "*Plasmodium praecox*" was found 678 times, *Plasmodium vivax* 49 times and *Plasmodium malariae* 11 times. Mosquitoes were collected in all districts and at every season, and nearly always proved to be *Myzomyia funesta*.

*Plasmodium kochi.*—This parasite was found once in a *Callitrichus* monkey. The gamete forms were seen for three weeks before its death and flagellation was several times observed. Inoculations were made into three *callitrichus* and one *patas*, but without result. The parasites are figured.

*Filariasis.*—Guinea-worm is rare, especially as compared with the Baguirmi district in the Lake Chad direction, where it is extremely common. *Filaria volvulus* is also rather rare. On two occasions sheathless microfilariae were found in the blood which the author believed to be *volvulus*, though no tumour was present. To obtain the endemic index of the various filariae the author examined two groups of natives from various districts. In 217 blood examinations made at night *Microfilaria nocturna* was found 47 times or 21·56 per cent. In 181 made in the day *Microfilaria diurna* was found 4 times or 2·2 per cent. *Microfilaria perstans* was very common. In 181 examinations it was found 64 times or 35 per cent., and still more often in night blood. Comparisons are made with the endemic index in other parts of French Africa.

\*The paper opens with a section on Trypanosomiasis, which has been dealt with elsewhere (p. 277).

**Goitre.**—A large number of goitrous subjects was found in the Bédioudo sub-division [see map]. In some villages near Goundi nearly 80 per cent. of the population were attacked. The disease affects men, women, children, dogs, goats and perhaps horses; it is said to be spreading. It was observed amongst various native races. The author does not think that it can be attributed to any physical or chemical property of the drinking water. He says the country is a kind of plateau, little raised and traversed by marshy rivers. Inoculations were made into goats, puppies and monkeys, but with no result. The author is inclined to think the disease is of parasitic origin; he cites the case of a child which suffered from fever for a month without evidence of malaria, the fever being followed by goitre. He says also that he discovered a reduviid bug in this district, *Acanthaspis sulcipes*, Fabr.

A. G. B.

**RODHAIN (J.). Quelques aspects de la pathologie indigène dans l'Ouélé.**—*Bull. Soc. Path. Exot.* 1915. Dec. Vol. 8. No. 10. pp. 734–745.

The observations here recorded were made during a journey taken by the author in this district for the purpose of studying sleeping sickness. The Ouelle district is in the north-east of Belgian Congo.

**Malaria.**—The author gives a table of spleen examinations. Of 810 children examined in seven places, 65 of whom were between six months and two years and 745 between three and seven. 75 per cent. of the first class had enlarged spleens and 56 per cent. of the second, or an average of 58.2 per cent. It is concluded that the disease is very prevalent both in the savannah and in the forest districts. As in most tropical countries the adult native enjoys only a relative immunity and gets slight attacks of fever. The author has seen natives who were severely attacked by the disease even in their own country; two such cases are cited. He supposes that an intercurrent disease had lowered their resistance. In all parts of the Ouelle district he was able to find *Anopheles*. In stations built near the Ouelle river *Culicidae* were more abundant in the dry season than in the rains; this is explained by the fact that when the water falls stagnant pools are left amongst the rocks, in which the mosquitoes breed.

**Leprosy.**—Leprosy was met with throughout the district. The author saw 56 lepers, eight of whom had the tubercular form, two the mixed form and 46 the nervous form. According to the observations of LEBOEUF and SALOMON in New Caledonia the predominance of the last-named form marks the decline of the epidemic stage. A more careful enquiry is necessary to show if this is the case in the Ouelle district.

**Pulmonary tuberculosis.**—This disease is definitely established in the large towns, Boma, Leopoldville and Stanleyville. Seven cases were seen in the Ouelle district. Details are given wherein it is shown that one was an old soldier, another a boy who had lived with him, two others natives who lived where there was a rest house for Europeans, and another belonged to a mission; nearly all in fact had come in contact with Europeans.

*Goitre*.—The type of goitre seen was benign or mountain goitre. The tumours were not very big. Women are attacked rather than men, and children below ten are free [cf. this *Bulletin*, Vol. 5, p. 435, where it is written of the distribution of goitre in India (McCARRISON)—It is very rare in children under eight and is much more common in women than men.] In one part of the district the disease is extremely frequent; 20 women had it out of 38 examined.

*Elephantiasis* and *Filaria volvulus*.—In this district the situation is analogous to that described by OUZILLEAU for the Upper Oubanghi [see this *Bulletin*, Vol. 1, p. 420]; that is to say, there is a relatively great frequency of elephantiasis amongst the natives, corresponding to the general presence of *Onchocerca volvulus*. In 13 persons infected with *O. volvulus* the microfilariae were found in the inguinal or crural glands. In six cases carefully examined the author was not able to find the worms in the blood before or after centrifugation; he thinks that their presence in the blood is infrequent. He examined from the volvulus point of view all the bearers of enlarged cervical glands who were punctured for trypanosomes. Of 72 natives so examined 50 had volvulus tumours, which he thinks indicates that this filaria may be a contributory cause of swollen glands in the neck. The swelling is characterised by the presence of two or three moderately enlarged glands, somewhat hard, containing on puncture syrupy yellowish fluid in which the filariae are found. Lymphocele is common and elephantiasis of the scrotum is more frequent here than in any other part of Belgian Congo. One case was observed in a boy of six. As to whether *O. volvulus* plays any part in the production of elephantiasis he does not come to any conclusion.

*Bilharziasis* and *Amoebiasis*. *Schistosoma mansoni* was met with twice in natives and once in a European. Amoebic dysentery on the other hand is common and widespread.

*Banga*.—Under the name of “banga” certain tribes designate an hysterical affection which chiefly affects women from the age of puberty and resembles the “latah” of the Malays. Influenced by some emotion such as fright or anger the patient suddenly utters a loud cry and falls to the ground, his body shaken with convulsions; then he gets up suddenly, rushes across the village, uttering strident sounds and escapes into the savannah or forest, sometimes going far from the frequented paths. As a rule he is stopped by his relatives; he then changes his direction and goes on till, exhausted, he is brought up against a hut where convulsions put an end to the crisis. This may recommence a short time after and be repeated several times in the day. Another form not infrequent is accompanied by aphasia, which may be complete, the patients being absolutely silent for some months. One case was seen in a young woman. The author cures these cases by suggestion. In the young woman aforesaid stigmata of hysteria was sought, but nothing was found except slight diminution of the sensibility of the pharyngeal mucosa.

*Relapsing Fever*.—This disease has not yet made its appearance, but it is to be feared that it will follow the introduction of *Ornithodoros moubata* from Uganda.

**FORSYTH (Charles E. P.). Coolie Anaemia.**—*Indian Med. Gaz.* 1915. Dec. Vol. 50. No. 12. pp. 453-455.

The author, who writes from Tezpur, Assam, states that in the medical care of coolie labour on Assam tea estates anaemia is one of the chief diseases to be contended with. "Coolie anaemia," he finds, is associated with ankylostomiasis, malaria, any debilitating disease such as dysentery and colitis, pregnancy and lactation, "famine disease," and excessive or ill regulated manual labour. Large numbers of cases have to be dealt with and strict individual treatment is often hard to apply. The following is the author's account of the methods he has found useful:—

"A general muster of the labour force in each garden is held every quarter when, in the first place, all apparent cases of anaemia are freely selected by inspection. The haemoglobin index of each of these is then taken with Tallquist's Haemoglobin Scale, which affords a ready and sufficiently accurate means. All persons showing an index of 70 or over are passed as in this respect fit, and those with an index below that figure are listed for routine treatment, known malarial cases being placed in a separate "spleen" list, and known cases of other distinct diseases being reserved. Indices of below 50 are specially noted, and all, if any, below 40 go immediately to hospital.

"Subsequently, the haemoglobin index of all on the anaemia list is taken regularly every fortnight, and the figures carefully recorded. All who show under treatment an index of 70 on two consecutive examinations, or who once reach 80 are discharged recovered. Cases that do not respond to the routine treatment are marked for further investigation. A certain number of these are found to require active anthelmintic treatment, some are sufferers from chronic malaria and a few may require some special treatment in hospital or some degree of change of work."

The routine treatment is a "mixture of sulphate of iron, sulphate of magnesia and nux vomica given twice daily." Coolies with a haemoglobin index of 50 or under get also izal, 10 minims twice daily in an ounce of water, which is said to yield excellent results. For anthelmintic treatment beta-naphthol is preferred, given in drachm doses, 25, 20 and 15 grs. at intervals of an hour, preceded and followed by a purgative. This treatment is repeated at intervals of 4-7 days till the worms disappear from the stools. The precaution is taken of examining the patient's urine for albumin and the treatment is always carried out in hospital. Cases of anaemia due to chronic malaria, accompanied by enlargement of the spleen, have treatment with quinine combined with iron and arsenic.

The author states that the number that respond rapidly to simple routine treatment is, as a rule, great; there is however an obscure class of case in which the results are not satisfactory. "Here dropsy is always a prominent feature, rise of temperature may be present, but is usually not found, blood films and counts give no definite information, no changes are discoverable in the nervous system, and nothing seems especially to point to anaemia of this type being either a deficiency disorder, due to food poisoning, or of parasitic origin."

In a period of three years slightly over 23 per cent. of anaemic coolies had special anthelmintic treatment; in 67 per cent. ankylostoma was found. In an average labour force of 6,443 the incidence of coolie anaemia has fallen in three years from 18.8 per cent. to 15 per cent. It is noted that the prospect of efficient conservancy arrangements is exceedingly remote.

A. G. B.

KERSTEN (H. E.). **Zur Frage des Bevölkerungsrückganges in Neupommern (Deutsch-Neuguinea).** [Is the population of New Pomerania decreasing?]*—Arch. f. Schiff.- u. Trop.-Hyg.* 1915. Nov. Vol. 19. No. 21. pp. 561-577.

In 1913 KOPP published an article under the above title [see this *Bulletin*, Vol. 3, p. 283] giving his observations made in the north of New Pomerania, which is the principal island of the Bismarck Archipelago and contains nearly 9,500 square miles. He concluded that there was a decrease of population and attributed it to the backward state of civilisation (*Unkultur*) and to epidemics. The author's observations were made in the island of Neu-Lauenberg, eastward of New Pomerania, and in the Sulka settlement in the Gazelle peninsula of the latter island. These areas contain different races, Kanakas and Sulkas. As regards the Kanakas, if the population is decreasing, this is not due to degeneration and inbreeding as is usually assumed: In 1910 there were 608 children to 1,000 adults (the observations concerned nearly 20,000), which, the author thinks, makes a decrease of population very improbable [limit of age of "children" not stated]. In Neu-Lauenberg women over 40 were questioned as to the number of children they had borne; 92 had had 393 or 4·27 children apiece and only eight had not borne children, statistics which, the author states, are similar to those of Germany [there are obvious fallacies in such a method of inquiry]. In the first four years of life 119 children died, and later another 69, in all 47·8 per cent. Many Kanakas fall victims to epidemics; old people are rarely seen.

Records of the diseases prevalent were made in the neighbourhood of Rabaul. Sores on the leg and foot of a serious character are common and appear often, in the older children, to lead to death; salvarsan and neosalvarsan fail, though the organisms of *ulcus tropicum* are found. Yaws is common, but light in character; the natives recognise the value of salvarsan and take intravenous injections willingly. Malaria in all its forms occurs. Dysentery claims numerous victims; the water supply is insufficient. The bacillary form is chiefly met with, the amoebic form in only a small number of cases. The disease is often associated with ankylostomiasis, especially in cases rebellious to treatment. Ankylostomiasis is very widely spread. *Tinea circinata* and *tinea imbricata* are wide spread and occur chiefly in anaemic and badly nourished people. "Infectious conjunctivitis" is common and leads often to complete blindness. Tuberculosis is not common and is certainly not yet epidemic. Gonorrhoea is very common especially round stations, but syphilis was not seen. Venereal granuloma is found, chiefly in natives from Neu-Mecklenburg; salvarsan is of no value. Leprosy is very rare and beriberi is only seen in labourers who live on faulty rice. The author thinks that extensive hygienic measures will prevent a decrease of population, if such should tend to be brought about in the Kanakas by infectious diseases.

The conditions met with among the Sulkas, on a single visit, are dealt with more shortly. These people are well nourished and live in clean well-built houses, but they keep large numbers of pigs in them and bury their dead under the floor. The conditions of water supply are bad. There is no evidence that the numbers are decreasing (892

only were seen), but of recent years the mortality has increased, which the author attributes to withdrawal of the young men for labour, to the detriment of the nourishment and housing of those left behind. The diseases chiefly observed were malaria and yaws. Of 104 submitted to von Pirquet's test 34 reacted. He suggests that recruiting among the Sulkas be suspended. Positive recommendations are added.

A. G. B.

POST (D. C.). **Some Medical Aspects of the Upper Yangtze River Country.**—*U. S. Nav. Med. Bull.* 1915. Oct. Vol. 9. No. 4. pp. 620-629. With 2 maps.

The author, who is an Assistant Surgeon, U.S. Navy, gives a resumé of one calendar year 1913-14, in the Deutsche Poliklinik, Chungking, from data furnished by Dr. Paul ASSMY.

A clinical or laboratory diagnosis was made in 4,787 cases. Under heading Infectious Diseases there were nine cases of *typhoid*, including four British sailors: 56 cases of *dysentery*, 38 of which were amoebic and the rest part flagellate and part bacillary. The spread of the disease is believed to be due to flies. Of *malaria* there were 30 cases, 26 tertian and 4 aestivo-autumnal. *Relapsing Fever*, 7 cases. *Rheumatism*, 156 cases. *Beriberi*, 3 cases. *Unclassed Fevers*, 35 cases. Tumours of spleen of unknown origin 7 cases; no organisms found, cultures negative. *Leprosy*, 4 cases. No *filariae* were found. The helminth findings are tabulated: *ankylostomes* were found 109 times in 752 examinations. Only three cases were in females. "The disease is universal among trackers, water coolies and laborers, who go about barefooted. Women bind their feet and thus do not expose them." *Schistosomiasis* has not been seen above the gorges of the Yangtze by Dr. ASSMY. *Gonorrhoea* was seen in 176 cases, *syphilis* in 521 (30 congenital, 32 tertiary, and 459 primary and secondary). *Eye diseases* were common. *Otitis media* (mostly tuberculous), 78 cases. Scabies, ringworms, impetigo were common. Twelve cases of "frost-bite" were seen, though the temperature never goes down to freezing point. Of *ulcus tropicum* there were 21 cases. Pulmonary tuberculosis, 104 cases; skin tuberculosis, 84; tuberculosis of glands, 103; of joints, 27. The use of cows' milk is practically nil.

Chungking is about 29.5° north latitude. It is built almost entirely upon solid rock. Its wall includes one square mile and approximately 450,000 people. Refuse is cleared away by the violent rains. The summer temperature averages 102° in the shade.

[It is interesting to compare these findings with those of VADON at Yunnan-Fou (this *Bulletin*, Vol. 5, p. 376), which would appear to be much less visited by disease.]

A. G. B.

LUTZ (Adolpho) & MACHADO (A.). **Viajem pelo rio S. Francisco e por alguns dos seus afluentes entre Pirapora e Joazeiro.** [A Journey to the River S. Francisco and some of its Affluents between Pirapora and Joazeiro.]—*Mem. Inst. Oswaldo Cruz.* 1915. Vol. 7. No. 1. pp. 5-50. With 18 plates.

The report of a journey made by two of the staff of the Instituto Oswaldo Cruz through the region watered by the river San Francisco,



in Brazil, in search of foci of endemic disease, and for the collection of mosquitoes and other biting insects. The diary of Dr. Lutz, which is printed at length, makes interesting reading, but unfortunately British maps of Brazil are not on a sufficiently large scale to follow the wanderings of the party in any detail. The Brazilian names for most of the animals and plants met with, are also not to be found in ordinary Anglo-Portuguese dictionaries. A list of the biting insects taken is appended.

J. B. Nias.

LAFONT (A.), DUPONT (V.) & HECKENROTH (F.)\*. **Affections oculaires rencontrés en A.O.F. et essais de traitement par les sérums thérapeutiques seuls ou associés aux injections intraveineuses de Ludyl et de Galyl**—*Bull. Soc. Path. Exot.* 1915. June. Vol. 8. No. 6. pp. 404-414.

The eye diseases with which this paper deals were treated at Dakar from 1913-1915. This is a sandy district and eye affections are favoured by the quantity of dust which flies about. Other causes are the plague of flies in the hot season and the dirtiness of the natives, which is increased by the scarcity of water. The authors examined 127 cases of eye disease and treated 58. The most frequently observed lesions were—chronic conjunctivitis, sometimes of several years' duration, accompanied by granulations and opacity of the cornea; staphyloma, leucoma, phlyctenular keratitis, ulcers of the cornea, hypopyon with sometimes menace of perforation, iritis, prolapsed iris, iridochoroiditis and glaucoma. The table sums up the form of treatment.

Malades traités.	Anti-diph.	Anti-téta.	Anti-strep.	Anti-venim.	Anti-pest.	Sérum humain.	Sels arsen.	Total.
Avec un sérum thérapeutique ..	8	3	3	2	1			17
Avec un sérum thérapeutique associé aux injections de Galyl ..	5	2	3	5				15
Avec un sérum thérapeutique associé aux injections de Ludyl ..	3	2	1					6
Avec le sérum du malade ..						2		2
Avec les injections de Galyl ..							8	8
Avec les injections de Ludyl ..							1	1
Total .. ..	16	7	7	7	1	2	9	49

In every case a bacteriological examination of the secretion was first made. To the patient was then given a dilute solution of oxycyanide of mercury to bathe the eyes for two days, and then a subcutaneous injection of 6-7 cc. of serum. Some drops of the same

\*In the October number of the same journal it is stated that Heckenroth's name should not have appeared as co-author.

serum were instilled into the affected eye, which was covered with a pad of wool soaked in the serum and retained for 24 hours. Under this treatment improvement took place very rapidly. All the therapeutic serums gave good results. One patient tried to bribe the attendant with five francs to get a flask of serum. Details of the cases follow. The conclusions are to this effect:—

(1) The therapeutic serums used are wonderful remedies in a large number of eye affections. The results obtained by their employment, in the case of natives, were shown to be the more efficacious the more acute the disease was and the earlier it was treated. In some less favourable cases, however, a great improvement was obtained both in the lessening of pain and in the diminishing of corneal opacity.

(2) The best results have been obtained by the subcutaneous injection of the serums, accompanied by their local application. One can without hesitation make several subcutaneous injections at a few days' interval.

(3) The employment of the serum of the patients, or of patients attacked with similar diseases, does not appear advisable owing to its rapid change and to the marked reactions which were noticed in one case out of two, but the careful study of this question should be taken up.

(4) In ocular affections which resist all treatment the results of the addition to the serums of intravenous injections of galyl or ludyl in small doses repeated several times a month (every week, every ten or fifteen days) are most encouraging. They act as powerful tonics or, in the case of old syphilitics, who are so common among the natives of French Equatorial Africa, as specifics. Galyl is preferred to ludyl; the latter changes quickly in the tropics, the former is more stable and more active.

(5) The authors' conclusions on the value of curative serums in blacks are stated to corroborate the results of DARIER.

In the discussion on this paper MORAX questioned whether the authors were right in attributing the results to the serums. In regard to the details of the cases he queried the diagnosis in some instances. He was unable to convince himself of the therapeutic activity of the serums employed, and noted the absence of controls.

In the October number of the *Bulletin de la Société de Pathologie Exotique* (p. 557-60) LAFONT replies in detail to the objections of MORAX and concludes: We are still convinced of the activity of the therapeutic serums in eye diseases, combining subcutaneous injection with local applications and giving, or not, arsenicals intravenously according to the general state.

A. G. B.

CASSONE (Giuseppe). **Il bubbone climatico nella sua sindrome, etiologia, anatomia patologica e diffusione geografica. Rivista sintetica e contributo clinico.** [Climatic Bubo, its Symptoms, Etiology, Pathological Anatomy and Geographical Distribution. A Comprehensive Review, and a Clinical Contribution.]—*Malaria e Malut. d. Paesi Caldi*. 1915. July-Aug. Vol. 6. No. 4. pp. 193-207. With 1 text-fig.

The recent occurrence of cases of climatic bubo in Southern Italy and Sicily, some of them in persons who had never been out of the country, furnishes the author with the opportunity of providing an exhaustive account of the condition for the benefit of Italian practitioners. The description given of the symptoms of climatic bubo, and the review of the opinions entertained in different quarters as to its pathology, are both very good, but do not add much to what will be found already in the most recent textbooks on tropical

medicine. In the case of Italy, many of the sufferers are sailors, belonging either to the merchant navy or to the National Marine, who have returned from a cruise in Eastern waters, and there is therefore always the lurking suspicion that the bubo may be in reality a masked form of plague, the so-called *pestis minor*. The differential diagnosis of these two conditions is a point which the author considers at length. Notes are furnished of two cases which came under his personal notice, and in one of these a gland was excised and submitted to microscopic examination, with negative results as regards the discovery of the causal agent.

J. B. N.

Luz (Fernando). **Bubão climático.** [Climatic Bubo.]—*Brazil Medico.* 1915. Oct. 30. Vol. 29. No. 41. pp. 323-325; Nov. 6. No. 42. pp. 332-334.

Short notes of ten cases of climatic bubo, presenting nothing of peculiarity. In some of the cases alternate injections of nuclearsitol and iodone Robin were employed, with apparent benefit; but the author is not very explicit as to the nature of these two preparations, nor as to the indications for their employment.

J. B. N.

Da MATTA (Alfredo A.). **Iodotherapia endovenosa no bubão tropical.** [Intravenous Injection of Iodides in Tropical Bubo.]—*Brazil Med.* 1915. Nov. 13. Vol. 29. No. 43. pp. 337-339.

Four cases of tropical bubo treated with massive intravenous injections of iodide of sodium with apparently good results.

*Case I.*—Male, aged 36 years. Admitted to hospital on the second day of symptoms, with pains all over the body, headache, vomiting and swelling of inguinal glands on both sides. Diagnosis, tropical bubo. Received, on the following day, an intravenous injection of 5 grammes of iodide of sodium; on the day following 10 grammes; on each of the third and fourth days, 15 grammes, being 45 grammes in all, in four days. No external treatment. Cure, on the 10th day. The temperature fell to normal after the third injection. Gain in weight by patient, 1.52 kilogrammes.

*Case II.*—Male, aged 30 years. Had suffered from malaria, and also nine years previously from blenorragia, which had resulted in stricture. Applied for treatment on the fourth day of symptoms, with two inguinal glands of the size of lemons. Diagnosis, tropical bubo. Given at once, endovenously, 5 grammes of iodide of sodium; on the next day 10 grammes, and on the two following days 15 and 20 grammes amounting in all to 50 grammes. Cure on the ninth day. The temperature fell on the fourth day. Gain in weight 1.07 kilo.

*Case III.*—Male, aged 38 years. Had suffered from bronchitis and blenorragia. Had had for nearly a year past fever and pains all over the body and bubo in the right groin, for which he had been treated medically with syrup of iodide of potassium. Received three injections of 10, 15 and 20 grammes of iodide of sodium. Cured in eight days. Gain in weight 1.07 kilo.

*Case IV.*—Male, aged 23 years. Adenitis in the left crural region for 21 months. No previous treatment. Had had malarial fever. Five injections given, two of 5 grammes, two of 10, and one of 20 grammes of iodide of sodium. Cure in 10 days. Gain in weight .98 kilo.

The author believes that this system of injections of iodide of sodium, due to KLEMPERER, constitutes a veritable specific for tropical bubo.

J. B. N.

EMILY (J.). **Adénites tropicales.**—*Bull. Soc. Path. Exot.* 1915. Oct. Vol. 8. No. 8. pp. 611-620.

The author calls attention to the frequency and severity of cases of adenitis treated in hospitals in the colonies, and the long time taken to cure them. He discusses at some length this frequency and the tendency there is to suppuration. He limits his remarks to inflammations in the groin as being most frequently observed and requiring most often intervention. He considers the regions drained by the lymphatics of this region and points out that erosions and ulcerations of the skin are more frequent in the tropics than in temperate regions. Moreover, the intestinal mucous membranes are more subject to ulceration, and affections of the liver lead more often to haemorrhoids which easily become ulcerated. One must consider, he adds, not only the seed but the soil. The more severe forms are seen in debilitated subjects, and he asks whether every European who is transplanted to the tropics cannot be so described. He mentions also such depressing conditions as defective diet, faulty hygiene, over-work, etc. He points out that the average stay in hospital for such patients is at least two months.

In order to shorten this period and obtain a more rapid cure he introduces into these gland tumours iodoformed ether. When a patient comes to consult Emily he puts him in hospital, the affected part is shaved and the most prominent part is marked out; this is touched with tincture of iodine and punctured with a Pravaz syringe containing a small quantity of iodoformed ether (5 per cent.). Three or four drops are introduced into the middle of the gland, never more; a sharp pain is experienced which, however, soon disappears. After four or five days, sometimes earlier, the tumour begins to diminish and the fever falls. In a week or more the gland is scarcely perceptible and quite painless. If the tumour is composed of several glands, the puncture is made into the one which occupies the centre. On two occasions fluctuation was already established; in these cases also a good result was obtained. In one instance the patient was mobilised and had to be treated as an outpatient; the result was equally good. The author always employs other measures. The patient is kept in bed and has damp compresses with, for the night, friction with mercurial cream. At the same time he receives subcutaneous injections of cacodylate of soda, and iodide of potassium at his two chief meals. Single injections have always sufficed for cure except in two cases when two were given at some days' interval. Details are given of nine cases, three of which were furnished by the author's colleague, KERNEIS. The accounts given bear out what has been said above. A. G. B.

VIVIÉ. **Eléphantiasis de la verge et du scrotum consécutif à l'extirpation bilatérale totale des ganglions inguinaux.**—*Bull. Soc. Méd.-Chirurg. Indochine.* 1915. Apr. Vol. 6. No. 4. pp. 151-154. With 2 figs.

The patient was a Frenchman, aged 39, who had been in Indochina ten years, and had never been ill. In October 1912 he had double adenitis of his inguinal glands of venereal origin and entered hospital, where the glands were completely removed. He left in February 1913 with a normal scar. Twenty days later there appeared on his right

thigh a red plaque, 10 cm. in diameter, raised and very painful; this disappeared and reappeared in another situation, a month later disappearing completely. Then began periodical swellings first of the prepuce, then the penis and finally the scrotum. This went on through 1913 without fever and without pain. From January 1914 the increase was continuous with attacks of fever and redness of skin. In December 1914 he entered hospital again, when there was found to be a moderate elephantiasis of the penis and scrotum, the organs remaining separate. The scrotum was as large as an adult's head. Examination of the blood taken on several occasions at midnight near the tumour did not reveal microfilariæ. The operation which was performed is described with a figure.

The author concludes that the elephantiasis was the result of the radical operation on the glands on both sides. He thinks that such an operation should not be done, and points out that mechanical obliteration of the lymphatic trunks coming from a given region may produce a lymphangiectasis of that region having the classical features of elephantiasis, which would support the theory that such obliteration was the cause.

[Total extirpation of the inguinal glands has been recognised as a cause of elephantiasis. See, for instance, this *Bulletin*, Vol. 1, p. 93-4.]

A. G. B.

**MAYNARD (G. D.). Pneumonia Inoculation Experiment No. III.—*Med. Jl. S. Africa*. 1915. Sept. Vol. 11. No. 2. pp. 36-38.**

The author, who is Statistician to the South African Institute for Medical Research, states that at a meeting of the Mine Medical Officers held in March, 1914, it was recommended that "for the space of three months every other native passing through the Government and Witwatersrand Native Labour Association compounds should be inoculated with a polyvalent pneumococcal vaccine, both groups, inoculated and uninoculated, being kept under observation." The experiment was organised on behalf of the Chamber of Mines by the South African Institute for Medical Research. Reasons are given why previous experiments had been unsatisfactory. The polyvalent vaccine contained definite proportions of known Rand strains. The experiment commenced in July and lasted four months, a total of 55,900 natives coming in, 12,400 being East Coast natives, the remainder from Cape Colony and other parts of the Union.

Over a period of ten months there were 1,035 recorded cases of pneumonia, with 139 deaths distributed as follows:—

TABLE I.

	Cases.	Deaths.	Case Rate* per 1,000.	Death Rate* per 1,000.	Case Mortality.
Uninoculated ..	576	78	20·6	2·8	13·5
Inoculated ..	459	61	16·4	2·2	13·3
Total ..	1,035	139	18·5	2·5	13·4

\*N.B.—These are not rates per annum.

The table on page 325 gives the attack rates in 28 day periods after the date of inoculation.

It is clear, the author writes, that there is no significant gain to the inoculated after the end of the fifth period.

"Summarising the results of the previous enquiry, we wrote :—

"(1) That the attack-rate from pneumonia is apparently lessened by inoculation, a small positive correlation being obtained.' The present enquiry confirms this finding.

"(2) That the beneficial results observed are most marked during the first month after inoculation, and that they gradually diminish until at about the end of the fourth month, no protective power apparently remains.' In this experiment the protective value does not appear to last for more than five months at most. . . .

"(3) That there is little or no evidence that the case mortality is favourably affected by inoculation.' The present experiment confirms this.

"Considering the evidence obtained from all the experiments conducted on the Rand, I think the following statements are justified :—

"(1) That anti-pneumonia vaccination may be expected to reduce the incidence of pneumonia for a four or five month period. After this period no reduction in the attack-rate can be anticipated.

"(2) That we have no satisfactory evidence at present as to whether two or more inoculations will increase the value of the process, either in regard to reduction in the attack-rate, or length of period for which it is effective."

A. G. B.

SITSSEN (A. E.). *Waarom verloopt de croupuze pneumonie in Indië zoo atypisch?* [Why does Croupous Pneumonia run such an Atypical Course in the Indies?]*—Geneesk. Tijdschr. v. Ned. Ind.* 1915. Vol. 55. No. 5. pp. 533-549.

The author asks why croupous pneumonia in the tropics so often runs an atypical course. Out of 42 consecutive post-mortem examinations of cases of pneumonia, made in Batavia, 24 only exhibited the characteristic red hepatization of the lung. In tropical pneumonia the lung appears to be unable to exude the usual amount of fibrin, so that the affected lobes collapse more or less when the chest is opened, even when carnified; and in a considerable proportion of the cases examined the diagnosis could not be made during life, from the absence of physical symptoms. This state of things the author attributes primarily to concomitant disease of the spleen, due to malaria, and he gives a table showing the spleen weights of the 42 cases examined, in comparison with the condition of lung found. The larger the spleen, the less frank the type of pneumonia.

J. B. N.

MEYER (K. F.). i. *Epizootic Lymphangitis and Sporotrichosis. (Studies on American Sporotrichosis II.)*.—*Amer. Jl. Trop Dis. & Prevent. Med.* 1915. Sept. Vol. 3. No. 3. pp. 144-163.

ii. *The Relation of Animal to Human Sporotrichosis. Studies on American Sporotrichosis III.*—*Jl. Amer. Med. Assoc.* 1915. Aug. 14. Vol. 65. No. 7. pp. 579-585.

i. In the first of these two communications the subjects of epizootic lymphangitis and sporotrichosis are considered in some detail, especially the question whether the parasite of the former disease should be

[MAYNARD (G. D.).]

TABLE II.

Days	..	..	28	56	84	112	140	168	196	224	252	280	308	Total.
Uninoculated	..	..	119	120	83	86	57	42	38	20	9	2	0	576
Inoculated	..	..	97	90	60	56	43	46	40	15	7	4	1	459
Total	..	..	216	210	143	142	100	88	78	35	16	6	1	1035
Gain for Inoculated	..	..	22	30	23	30	14	-4	-2	5	2	-2	-1	117

assigned to the Protozoa or Blastomyces. The author decides in favour of the Blastomyces on the grounds that the staining reactions show that the granule which resembles the blepharoplast of leishmania is *metachromatic* and *not nuclear* material; that staining by Gram is always positive, whereas in the case of protozoa it is negative; that the intracellular position of the parasite is shown to be a phenomenon of phagocytosis, and not the expression of intracellular habitat. He bases this conclusion also on the structure of the parasite. The respects in which epizootic lymphangitis and sporotrichosis differ are set out in detail. The following are the conclusions:—

“Epizootic lymphangitis of equines is caused in South Africa, Algeria and Jamaica by a parasite which morphologically (Gram positive, irregular inside-structure, budding forms) has all the characteristics of a yeast and which biologically behaves, in the complement fixation test, like a blastomyces. The similarity with *Leishmania* bodies, which is suggested by some staining reactions (with Giemsa, etc.) and the position of the parasites in the phagocytes, is explained, and it is demonstrated that the serologic tests and the more careful morphological studies with hematoxylin stains do not justify the creation of a new species of lymphosporidium (Gasparini, 1908). The parasite is not a protozoon but a blastomyces, namely: the *Cryptococcus farciminosus*.

“In the United States the disease which was diagnosed as epizootic lymphangitis in 1907, has been recognised as being sporotrichosis. Epizootic lymphangitis apparently does not exist here. Morphologically, by cultures and serum tests, the two diseases can easily be separated. In horses the parasite of sporotrichosis is very rare in the pus and can rarely be demonstrated microscopically.

“The sera from sporotrichotic infections give complement fixation with the *Cryptococcus farciminosus*, indicating a relation of the *Sporothrix Schencki-Beurmanni* to the cryptococcus. This observation is further proof of the vegetable nature of the parasite of epizootic lymphangitis.

“Human infections from equine sources of epizootic lymphangitis and sporotrichosis are rare. It is in the interest of Comparative Tropical Medicine that suspected cases of infections of epizootic lymphangitis should, in future, be carefully investigated bacteriologically and serologically.”

ii. The author himself became infected in the laboratory with sporotrichosis when he was working with an equine strain. He gives the history of his infection, which was cured by iodine treatment. Other laboratory infections are quoted from De BEURMANN and GUGEROT's work.

Conclusions. “Spontaneous sporotrichosis of domesticated animals particularly horses, is very common in certain parts of the United States.

“Extensive bacteriologic, serologic experiments have proved the identity of the causative organisms in human and animal sporotrichosis. The pathogenicity for human beings was observed in an accidental laboratory infection.

“The geographic distribution of equine sporotrichosis, which is apparently closely connected with certain telluric and climatic conditions, covers, in two states, the same territories from which numerous cases of human infection have been reported in the last five years. In Pennsylvania, equine sporotrichosis—as so-called “epizootic lymphangitis”—has been noted in as many as 150 cases annually.

“Only two human cases are on record in that state. A careful study of one case suggested at first a contact infection with a sporotrichotic horse, but this assumption could not be proved conclusively. The evidence collected does not support the theory that human sporotrichosis is very frequently transmitted from horse to man in the United States. The



cases of Hyde and Davis, Sutton and others are discussed from this point of view, and compared with the cases reported by Gougerot, Carougeau, Lutz and Splendore, and Rouslacroix.

"The absence of sporotrichosis among veterinarians and farmers in Pennsylvania—where equine sporotrichosis is so exceedingly common and so often treated, calling forth undoubtedly close contact with infectious material—demonstrates that sporotrichotic infections in man are established by this channel of contact in rare instances only."

A. G. B.

**PIETROFORTE (Vincenzo).** *Sulle alterazioni del sangue nella scorbuto osservato in indigeni detenuti nelle prigioni di Assab.* [On the Alterations in the Blood of Scurvy, observed in Natives confined in the Prisons at Assab].—*Ann. Med. Navale e Colon.* 1915. Ann. 21. Vol. 2. No. 4. pp. 277-288.

Some rather brief and insufficient notes by a naval surgeon, taken during a flying visit to a penal colony at Assab in the Italian dependency of Erytrea on the Red Sea. About 20 of the native prisoners in a gaol at this place showed signs of scurvy in the shape of swollen and bleeding gums, articular swellings in the knees, and hardness of the muscles of the calves, due probably to interstitial haemorrhages. The condition had lasted in some of the cases for nearly two years, and apparently had been diagnosed as beriberi by those in charge of the prisoners, but the symptoms receded promptly when lemon-juice was administered, whether on the advice of the author or not, he does not say. There was nothing in the diet of the prisoners to account for symptoms of either beriberi or scurvy, but the life of the prisoners was indolent in the extreme, for want of occupation. The author made some estimations of the amount of haemoglobin in the blood of twelve of the patients, and obtained some blood counts from them afterwards through the agency of the prison surgeon. He also made some films, which were stained on his return to Italy. The general result of the observations was to show a largely reduced number of red cells per cubic millimetre, with a high haemoglobin value per cell, a reduction in the proportion of leucocytes, and a great tendency in the red cells to take up the basic dye of Giemsa and Romanowsky stains, so as to render them of a deep violet colour. The conditions under which these observations were made were evidently not favourable to a perfect result.

J. B. N.

**NICHOLLS (Lucius).** *An Epidemic of Acute Hydrocele and Orchitis in British East Africa.*—*Lancet.* 1915. Aug. 21. pp. 384-385.

The patients were African porters who had been recruited in the island of Zanzibar and were attached to the Carrier Corps of the East African Forces. On December 19th, 1914, eight porters suffering from this condition were admitted to the base hospital and on the next day another four. Three cases are described illustrating three degrees of severity.

**Case 1.** The scrotum was greatly enlarged, more so on the right side; the subcutaneous tissue was oedematous; the patient complained of much pain. A trocar was inserted on the right side and 9 oz. of turbid blood-red fluid were drawn off. From the left side 6 oz. of turbid fluid

were withdrawn. It was then found that the right testicle was enlarged, indurated and tender. The epididymis was undoubtedly implicated. The spermatic cord was not thickened nor tender. The patient was very ill; the temperature ranged from  $100.5^{\circ}$  in the morning to  $103^{\circ}$  at night. The right hydrocele filled up again and the patient complained of increased pain. A week after admission he was chloroformed and an incision made which gave exit to 8 oz. of semi-purulent fluid from the hydrocele. An incision into the testicle let out creamy pus. The testicle and epididymis were completely disorganised and were removed. The patient made a good recovery.

Case 2 was less severe. Here again an operation was done. A small incision was made into the testicle and some turbid blood-stained fluid exuded. The enlargement of the testicle slowly subsided but the organ remained indurated and larger than natural.

Of the twelve patients two were severely ill, as in Case 1, and one testicle was removed in each case. Three cases showed similar severity to Case 2. The remainder could be placed in the same class as Case 3. Out of the original 400, 348 porters were now examined and hydroceles were found in 38; in 10 there were signs of inflammation in one or other testicle. Thus of these porters 13.8 per cent. had hydroceles and 6.1 per cent. orchitis. Care was taken to exclude venereal disease.

In smears made from slides from the fluid of the patient in Case 1 streptococci were found in long chains and arranged in pairs. By Gram the streptococci were less easily decolourised than *B. typhosus*, but did not retain the stain so retentively as staphylococci. From 9 of the 12 patients streptococci were grown of the same morphological appearance and giving the same tests. The author concludes that this streptococcus was the organism which caused the orchitis. The blood of 12 patients in hospital and 16 others who had hydroceles was examined.

"In 16 of these 28 cases *microfilariae nocturnae* were found. The conclusion is that filarial infection had caused the chronic hydroceles, and this prior infection had rendered the tissues of the patient liable to the attacks of other organisms, and the (diplo)-streptococcus, finding a favourable soil, had produced an epidemic of acute hydrocele and orchitis."

The author notes that the disease called endemic funiculitis is caused by a similar diplo-streptococcus.

A. G. B.

BREINL (A.) & PRIESTLEY (H.). Note on "Boomerang Leg." A Bone Disease occurring amongst Australian Aborigines.—*Jl. Trop. Med. & Hyg.* 1915. Oct. 1. Vol. 18. No. 19. pp. 217-218. With 1 plate.

Ernest BLACK, as quoted by CASTELLANI and CHALMERS, has drawn attention to a disease occurring among natives in Western Australia, the Northern Territories and the Torres Straits Islands, characterised by a bowing forward of the bones of the legs. The authors have observed such cases amongst the natives of North Queensland and the western parts of British New Guinea. The disease affects young natives of both sexes and the resulting deformity persists throughout life. In every case both legs were affected.

"The onset seems to be gradual; the children complain at first of pains in the shins, sufficiently severe to prevent them from walking. The skin over the tibia is tender to pressure, but there is no swelling noticeable. These pains become less severe in the course of time, the children begin to use their legs again, and the tibiae and fibulae bend forward gradually and assume the characteristic shape. In consequence of this the centre

of gravity of the body is displaced forward, the patient becomes flat-footed, and the gait shuffling. The deformed bones gradually increase in thickness, but retain their altered shape."

The authors were able to obtain an X-ray photograph of the leg of an affected Queensland aboriginal and the bones after death. These form the subject of the illustration. Both tibiae and fibulae were markedly curved with the convexity forward. A longitudinal section through the middle of the tibia showed that the compact substance was greatly increased in thickness over the greater part of the shaft and slightly decreased at both extremities. It was much denser in structure than normal and was of ivory-like appearance. The history of the disease and the appearance of the bone suggested that Boomerang leg is the result of a chronic osteomyelitis of both tibiae, taking at first the form of a rarifying osteitis, which is followed later by a condensing osteitis. The etiology is unknown but syphilis and tuberculosis can be excluded.

A. G. B.

**Van den BRANDEN (F.). Réaction méningée de la syphilis chez un Noir du Congo.**—*Bull. Soc. Path. Exot.* 1915. Oct. Vol. 8. No. 8. pp. 570-571.

A note from Leopoldville. A native was treated in January 1915 for a specific chancre by neosalvarsan (two 0.75 gm. injections). Four months later he returned emaciated, with difficulty in walking, intense headache and insomnia. Lumbar puncture gave a clear fluid containing 35 lymphocytes per cmm. The blood centrifuged on three occasions was negative for trypanosomes. He was treated with seven injections of grey oil and pot. iod. daily for two months. He improved progressively and in August his cerebro-spinal fluid was normal. The author has met with other similar cases.

A. G. B.

**COOK (Jerome E.) & MEYER (Jerome). Severe Anaemia with Remarkable Elongated and Sickle-shaped Red Blood Cells and Chronic Leg Ulcers.**—*Arch. Intern. Med.* 1915. Oct. 15. Vol. 16. No. 4. pp. 644-651.

The authors' case was that of a mulatto woman, æt. 21, who was born in S. Louis and had always lived there. The ulcer (a recurrence) just above the internal malleolus had existed ten months before she entered hospital, and soon healed there. The most striking feature in the blood preparations, both fresh and stained, was the shape of the red cells. "About one in three was elongated, oat-shaped or crescent-shaped. Some of the crescent-shaped cells in the fresh drop would curl and bend as if they were unusually pliable. . . . Nucleated reds were always present." The following counts are, the authors say, selected from a large number.

Cell Count and Haemoglobin.

Date.	Red Blood Cells.	White Blood Cells.	Haemoglobin. %
11/3/14	2,008,000	10,560	43
11/10/14	2,240,000	10,320	45
1/14/15	2,960,000	14,200	53

## Differential Counts.

Date.	No. of cells counted.	Normo-blasts.	Inter-mediate.	Lymphocyte. %	Large mono-nuclear. %	Poly-morpho-nuclear. %	Eosino-phil. %	Baso-phil. %
11/ 5/14	1,000	21	11	17.8	10.6	58.4	12.6	0.6
11/14/14	200	4	1	30.5	3	37.5	26	3
1/10/15	200	8	..	23	8	55	12	2

The eosinophilia was very variable. No parasites could be found in the blood or stools. There is the possibility of an inherited anomaly. Similar cases, abstracts of which are given in the paper, have been reported by WASHBURN and HERRICK. Of these cases and their own the authors write :—

“All three of the patients were of negro blood ; all three suffered from peculiar, indolent, recurring leg ulcer ; in all three the anaemia was sufficiently severe to cause dyspnea on exertion, and in all of the cases there was a peculiar discoloration of the sclerae, which in our case and that of Washburn is described as a “greenish tinge” and which Herrick notes as “a tinge of yellow” ; in no case could enlargement of the spleen be made out ; responsibility for the condition could not be placed on syphilis or a parasite, although a careful examination was made in each case for such a possible etiological factor.

“The uniformity of the blood abnormality is even more striking, the individual differences being of degree rather than of kind and depending no doubt to some extent upon the time at which observations were made.

“The red cells in the three cases, in the numerous examinations made, varied between 1,800,000 and 3,000,000 with a striking tendency to remain around 2,500,000. In all of these cases there was a leukocytosis of more or less marked degree, and in all cases there was an eosinophilia of distinct but varying degree. A varying number of nucleated red cells was present in all cases, in no case were they rare or difficult to find. A glance at the blood slides leaves no doubt as to the identical character of the elongated and sickle-shaped red cells. The percentage of these cells was greater in our case than in the other two, but even in these it was considerable.”

The anomalous cells are well shown in two photomicrographs.

A. G. B.

BRUNTON (Lauder). *Treatment of Scorpion Stings*. [Correspondence.]

—*Lancet*. 1915. July 24. pp. 200-201.

MACKENZIE (A. J.)—*Ibid.* Oct. 2. p. 781.

KING (W. G.)—*Ibid.* Oct. 9. pp. 835-836.

Sir Lauder Brunton thinks that permanganate of potash in his snake lancet would be useful for scorpion stings as well as snake bites. He writes that the lancets can be obtained for 2½d., less for quantities, from Messrs. Wm. Mitchell (Pens) Limited, 8, Warwick Lane, London, E.C.

A. J. Mackenzie writes from Hartley, Rhodesia, that proximal ligature and immediate scarification round the sting, followed by the rubbing in of permanganate of potash, gives the greatest relief. Stings from hornets can be similarly treated.

Colonel King used the permanganate method prior to 1886, on dozens of cases—proximal ligature, incision through the point of puncture, squeezing of the wound, and insertion of the permanganate. If the affected part were on a limb, it was soaked in strong and warm permanganate. He points out that the action of the scorpion virus varies greatly in different individuals.

[The permanganate treatment is that recommended by CASTELLANI and CHALMERS.]

A. G. B.

ROEMER (R.). **Die Gicht als Tropenkrankheit.** [Gout as a Disease of the Tropics.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1915. Sept. Vol. 19. No. 18. pp. 490-497; Oct. No. 20. pp. 529-554.

In the author's opinion "arthritis urica" or gout has greater importance in tropical pathology than is usually believed. Most of the text books of tropical medicine make no reference to it. [In the manuals of MANSON, and CASTELLANI and CHALMERS, the word gout is not found in the index.] The tropical practitioner, the author thinks, meets with the preliminary stages rather than the joint symptoms. Inflammation of the periosteum and tendon sheaths, muscular pains, neuralgia are often treated as rheumatic or syphilitic when they should be attributed to gout. These and a complex of symptoms such as dyspepsia, changes of disposition, languor, cramps in the calves, stiffness, migraine, are met with not only in the European, especially those who have returned to Europe, but also in the natives. [The author writes apparently of the Dutch East Indian Archipelago.] Seborrhæa of the face, nose, or hairy scalp and fine venous varicosities on the cheeks and nose of persons in the tropics betoken, in the author's view, latent gout. He admits that tropical climate has no influence on metabolism of purins. The views of physicians on the nature of gout from GALEN to GARROD are then considered. There follows a discussion of the foods rich and poor respectively in purins, with tables, and sample diets.

A. G. B.

SEHEULT (R.). **Three Cases of Gall-Stones, with Remarks on the Rarity of the Condition in Trinidad, B.W.I.**—*Practitioner.* 1915. Nov. Vol. 95. No. 5. No. 569. pp. 707-715.

Notes are given of three cases of gall-stones which occurred in the author's practice at Port-of-Spain, Trinidad. After a discussion of these cases the author remarks that he has searched the medical and surgical records of the Colonial Hospital, Port-of-Spain and has not been able to collect more than eleven cases of gall-stones among 64,126 admissions during the decade 1904-1914. In 7,557 autopsies gall-stones were found in only five subjects. Allowing for faulty diagnosis and incomplete post mortem records it would appear that gall-stones occur very rarely in Trinidad. The author considers that the diet of the population, one-third of whom are East Indians, rather supports the view that food poor in albumen tends to diminish the incidence of gall-stones.

[Compare the figures obtained by CLARK (this *Bulletin*, Vol. 6, pp. 424-5. The figure given as 4,088 in the last line of page 424 should be 1,088). Of 1,598 young West Indians autopsied in the Panama Canal Zone 49 contained gall-stones, i.e., about 3 per cent., as against .06 per cent. in Seheult's figures.]

A. G. B.

FOY (H. Andrew). **Inoculation of Small-pox as a Prophylactic Measure as practised by the Natives at Djen in Nigeria.**—*Jl. Trop. Med. & Hyg.* 1915. Nov. 15. Vol. 18. No. 22. pp. 255-257.

Djen is a large pagan settlement on the right bank of the Benue river in the Northern Provinces of Nigeria. The population is 4,700; males 1,200, females 1,500, and children 2,000. When the author arrived small-pox had been prevalent for five months, and 300 were said to have died. In the chief's section there were 84 persons, of whom four had contracted the disease. The rest were inoculated nine days before Foy reached the scene. He describes the process of inoculation. The lymph is taken on the ninth day from the pustules of a case of discrete small-pox in a young person. The results are summed up in the table on page 333.

The author draws attention to the fact that children show a greater susceptibility to the disease when inoculated than do adults. The mortality of the 26 cases that developed small-pox was nil, but mortality occurred among other inoculated cases. The incubation period in the naturally acquired disease is eleven days; in three inoculated cases it was seven.

"Of the twenty-six cases that developed small-pox six were badly marked, showing a fairly acute attack of discrete small-pox; the remaining twenty had slight marking as an indication of a mild attack."

The author refers to the use of salol in treatment in the following words:—

"If treatment by salol, 10 gr., three times a day, is begun within the first two or three days after the eruption appears it has the remarkable effect of lowering the temperature, the intensity of the suppurative phase is much modified, the pitting is much less marked, and the recovery is comparatively rapid. Carbolic oil (1 in 40) is applied daily to the eruption on the skin."

A. G. B.

PIETRI (Giovanni Andrea). **Contributo clinico allo studio del cosiddetto fegato infettivo acuto.** [A Contribution to the Study of the So-Called Acute Infective Liver.]—*Policlinico.* Sez. prat. 1915. Oct. 31. Vol. 22. No. 44. pp. 1469-1474.

The condition here described has nothing to do with tropical disease, properly speaking. TALMA, BOZZOLO, REMLINGER, SCHULTZE and others have already defined it under the names of benign parenchymatous hepatitis, acute infective liver, acute curable hepatitis and so on. It appears to differ principally from ordinary pylophlebitis by the non-fatal issue, so that the diagnosis always remains more or less in doubt. The patient whose case is recorded was a man who was kicked by a bullock in the left inguinal region. Signs of peritoneal injury followed, and the health became impaired. The symptoms

[Foy (H. A.)]

Statistics of the Results of Inoculation with Small-pox as a Prophylactic Measure carried out by  
the Natives at Djen, on the Benue, in Nigeria, West Africa.

Total Population in the Serikis Ungwa at Djen.	Sex.	Number.	Number had small- pox or previously inoculated.	Number inoculated with small-pox.	Local Reaction seen on the ninth day after inoculation.		Percentage of inocu- lated that developed a local reaction.	Total number of those inoculated that developed small-pox.	Percentage of those inoculated that developed small-pox.	Percentage of those with local reaction after inoculation that developed small-pox.
					Local reaction.	Local reaction nil.				
Males ..	..	14	7	7	6	1	85.7	2	28.5	33.3
Females..	..	24	12	12	9	3	75.0	4	33.3	44.4
Children	..	42	1	41	34	7	83.0	20	48.7	58.8
Total ..	..	80	20	60	49	11	81.5	26	43.3	53.0

complained of consisted in fever of a hectic type with headache, vomiting, disturbance of digestion and pain in the hepatic and hypochondrial regions with extension to the right shoulder. In the belief that the patient might be suffering from liver abscess or hydatid, the liver was explored through the usual transpleural incisions, but neither pus nor hydatid could be found. After the operation the patient began to improve and finally got quite well. A bibliography of papers bearing on the subject is appended.

J. B. N.

GUNSON (E. B.) & GUNN (J. W. C.). **An Epidemic of Jaundice occurring at Alexandria.**—*Lancet*. 1915. Dec. 11. pp. 1294–1295.

During June, July and August, 1915, the authors, Lieutenants in the R.A.M.C., treated “a large number” of cases of jaundice, all without exception being from a single camp. They give an account of the symptoms, from which the following is taken:—

“The liver was invariably enlarged, sometimes extending as much as  $3\frac{1}{2}$  inches below the costal margin; . . . there was marked tenderness. The spleen was similarly greatly enlarged, frequently extending upwards to the seventh rib in the posterior axillary line, one or two inches below the costal margin, and sometimes reaching as far forwards as the nipple line, splenic and liver dullnesses not infrequently merged one into the other. The spleen was tender, and pain in this region was a common symptom.

“The heart presented a very striking degree of enlargement in practically all cases. This enlargement was so definite and so persistent, associated as it was with giddiness and dyspnoea on exertion, as to make it almost the leading feature in the clinical picture. Cardiac dullness was almost constantly increased to the right, the right border of the heart frequently extending 2 inches, and in one case  $2\frac{1}{2}$  inches, to the right of the midsternal line. The cardiac impulse was frequently palpable to the right of the sternum. The apex beat remained internal to the left nipple line, the increase in the size of the heart apparently affecting the right side only. . . . The increase in the size of the heart, the liver, and the spleen was frequently confirmed by X-ray examination.”

The urine did not contain albumin. Most of the patients remained under observation from three to four weeks, when they were sent to England.

“In all patients marked general weakness persisted, and the majority were unable, after having been out of bed for two or three weeks, to perform even moderate exercise, such as walking upstairs, without inducing dyspnoea and giddiness, which were accompanied by marked increase in the pulse-rate; there was no praecordial pain. Some enlargement of the heart persisted in practically all cases, and was not reduced by rest.”

Various drugs were tried, but appeared to be without influence on the course of the disease. There were no deaths. D. THOMSON is said to have made a report on the blood, but it is not reproduced.

A. G. B.

KNAPP (H. H. G.). **“Morphine Injector’s Septicaemia” (“Whitmore’s Disease”).**—*Indian Med. Gaz.* 1915. Aug. Vol. 50. No. 8. pp. 287–288.

In 1912 Major WHITMORE, I.M.S., described the pathological anatomy and etiology of a disease that is met with fairly frequently in Rangoon. He called it “Morphine Injector’s Septicaemia.” The



author thinks it may be met with elsewhere in India. He gives an account of a case in a Burman who was admitted to gaol in apparently good health. Five months later he was taken ill with cough and fever. The base of the left lung was dull with loss of breath-sounds and diminished fremitus. A diagnosis of chronic tubercular pleurisy was made. After an illness of about 12 weeks with irregular fever he died. The lungs were found to contain "numerous areas of a grey yellow colour, of fairly firm consistency, irregular in outline, varying in size from two or three lines to half an inch across." There were small abscesses in the spleen and liver. From the lungs and spleen a motile bacillus was isolated which gave the cultural characters of that described by WHITMORE [see this *Bulletin*, Vol. 1, p. 588].

Since 1910 eleven instances of this disease have been met with in the Rangoon Gaol. It occurs in adult males of the poorer class. In nine cases the patient was an habitual morphine injector. General malaise and fever are early symptoms. The duration is for three months with pulmonary signs and symptoms. The lesions are highly characteristic and consist of the nodules in the lungs already described; they resemble areas of bronchopneumonia. Similar nodules were seen in the liver in three instances and in the kidney in one. There is a general similarity between this disease and glanders, both with regard to the symptoms and the pathology. It has however no relation to the horse, but has a very close relation to the hypodermic syringe. There are no skin lesions.

A. G. B.

McCOMBIE. **An Outbreak of Anthrax.**—*Indian Med. Gaz.* 1915. Aug. Vol. 50. No. 8. pp. 288-291.

The paper deals with two outbreaks, in 1901 and 1914 respectively, on the same garden in Assam, both associated with an anthrax epidemic among the cattle. There were 57 cases with 13 deaths, or 25·4 per cent.; nine were cases of internal anthrax, all of which died, leaving 42 cases of malignant pustule, of which four died. There was no doubt of the association with the cattle epidemic. In most cases the fact was established of either cutting up or eating cattle dead of the disease. An instance is given, however, to show that it by no means follows that eating anthrax cows will be followed by anthrax in the coolie. The author describes his cases of malignant pustule and then goes on to those of internal anthrax. Some cases of this form died quite suddenly in the lines; the only history one obtained in many instances was that they had been feeling ill the day before and got fever during the night and died. McCombie says there is nothing distinctive about the symptoms of these cases, which are very puzzling. One suggested acute obstruction. As a rule the bacilli are easily found in the blood. The post mortem always clears up the diagnosis.

The author treated his malignant pustule cases by the injection of 50 per cent. carbolic acid all round the pustule. He says he has not lost a case in which this has been done properly. The treatment of the internal cases is hopeless. He gives a few elementary facts about the disease in horses and cattle, and states that the most important preventive measure on a garden is to get early intimation of cattle deaths to prevent coolies getting the meat for consumption.

A. G. B.

**BREINL (A.) & PRIESTLEY (H.). Differential Counts and the Neutrophile Blood Picture of Natives—Adults and Children of New Guinea.**—*Ann. Trop. Med. & Parasit.* 1915. Dec. 30. Vol. 9. No. 4. pp. 495–505.

The material was collected during a journey through the coastal parts of British New Guinea, blood films being made from apparently healthy natives of different ages. All films containing microfilariæ or malarial parasites were discarded. From adults 104 films were examined and from children, apparently below 10 years of age, 50. For the differential counts 500 successive leucocytes were enumerated. The average figure for the polymorphonuclear leucocytes in adults was 51·06 per cent., maximum 81, minimum 28·9, which is somewhat below the normal European average. The average number of lymphocytes was 32·1 per cent.; an observation which agrees with those of previous investigators, who have found that the relative number of lymphocytes in the blood of native races in the tropics is definitely increased. The average number of eosinophiles was 11·97, maximum 31, minimum 0·4. The differential counts of 50 children showed similar but more pronounced changes. The average Arneth index in the adults was 74, practically the same as that in North Queensland school children. The average index in the children was 83·86 per cent.

The conclusions are as follows:—

“1. Differential counts on 104 adult natives of New Guinea show a decrease in the number of neutrophile leucocytes and an increase in the number of lymphocytes and eosinophiles.

“2. Differential counts of 50 native children show similar but more pronounced changes.

“3. Arneth counts of adult natives show a marked shift to the left, the average Arneth index being 74·0.

“4. Arneth counts of 50 children gave an average Arneth index of 83·86.

“5. The identity of the Arneth index of adult natives with that of healthy school children in North Queensland strengthens the assumption that climatic influences, *per se*, cause a ‘shift to the left’; but the still greater shift in native children is probably due to active or latent infections.”

A. G. B.

**MACFIE (J. W. Scott). Nuclear Variations of the Neutrophile Leucocytes (Arneth Counts) in Malaria and Yellow Fever.**—*Ann. Trop. Med. & Parasit.* 1915. Dec. 30. Vol. 9. No. 4. pp. 435–456. With 4 charts.

The author writes that in considering the significance of a shift to the left of the Arneth count, such as is found in Europeans in the tropics, it is important to determine in the first instance the effect on the polymorphonuclear leucocytes of the diseases prevalent in these climates, and especially malaria. He examined 29 apparently healthy Europeans in the Gold Coast and found the average Arneth index to be 51·6, maximum 75, minimum 32·5; that is, there was a slight shift to the left, such as was found by CHAMBERLAIN and VEDDER in healthy American soldiers in the Philippine service. Practically all had suffered from malarial fever at some time and the author believes that this is a sufficient explanation of the left shift. He notes that some

showed a normal Arneth count after more than a year's residence in West Africa. Arneth counts were then made in the case of 20 apparently healthy natives at Accra. The average index was 55·9, maximum 98·5, minimum 55·9, again a slight shift to the left. He believes that in this case also the shift is to be accounted for by malaria and possibly other diseases.

*Malaria! Fever.*—He refers to his previous paper [this *Bulletin*, Vol. 6, p. 345] and to that by KNAPP [*loc. cit.*]. He has made counts in 44 cases of proved or suspected malarial fever. In 23 cases in which malarial parasites were found, 10 being Europeans and 11 natives, in each case there was a very marked shift to the left, maximum 97·5, minimum 74, average 86·6. The index was rather higher in the natives than in the Europeans. In nine cases, all Europeans but one, in which there was only presumptive evidence of malaria, the index averaged 79·3. In 12 other cases of fever suspected of being malarial there was again a shift to the left, the index being 71·35. The complete figures are in each case given in tables. In severe cases the majority of the polymorphonuclear leucocytes were of the types included in Class I, especially forms with simple horse-shoe shaped nuclei. The author notes that this effect is observable before the onset of the attack of malaria and gives an example. The shift may persist for a considerable time after the attack is apparently cured, as is shown in Table VI. ]

TABLE VI.—Successive Arneth counts in a severe case of malarial fever in a native.

Date.	Clinical Condition.	Arneth Classification per cent.					Arneth Index.
		I.	II.	III.	IV.	V.	
1/14/15	<i>P. falciparum</i> , 1 to 400 R. B. C.	67·0	25·0	8·0	—	—	92·0
1/15/15	<i>P. falciparum</i> , 1 to 713 R. B. C.	46·0	43·0	11·0	—	—	89·0
1/25/15	Well	27·5	47·0	22·0	3·5	—	74·5
2/9/15	Well	20·0	42·5	34·5	3·0	—	62·5
2/24/15	Well	18·5	43·5	34·0	4·0	—	62·0

*Yellow Fever.*—The author made his counts on a series of blood films collected by Dr. J. M. O'BRIEN from cases of yellow fever at Guayaquil [this *Bulletin*, Vol. 5, p. 76.] They were taken on thirty-five days from 17 cases of yellow fever. The author considers here the films which were made on the first days and observes there was a profound shift to the left, more pronounced than in malaria. The index was 90·5, maximum 99 (3 cases), minimum 72·5. He thinks that the occurrence of a very high Arneth index in a suspicious case of fever in which no malarial parasites could be found would be strongly in favour of a diagnosis of yellow fever, especially as in cases of obscure malaria the index is less high than in pronounced cases of malaria. The difference is shown graphically in charts.

He proceeds to discuss the significance of the changes observed and refers to the view of ARNETH, CHAMBERLAIN, and BREINL and PRIESTLEY. [See also page 298.]

The summary is as follows :—

"1. A slight shift to the left of the Arneth count is found in the blood of healthy Europeans in West Africa.

"2. There is a marked shift to the left in malarial fever which is evident not only during the attack, but also before its onset, and for a considerable time after convalescence is established.

"3. It is probable that the abortive inoculations with malaria parasites by infected mosquitos, which are a part of the daily life in many parts of West Africa, are sufficient to account for this shift in apparently healthy Europeans, without postulating a specific action of the climate on the white races living in the tropics.

"4. In yellow fever there is a great shift to the left of the Arneth count.

"5. It is suggested that the changes observed in the Arneth counts are due to toxæmia causing a destruction of the circulating polymorphonuclear leucocytes, and a flooding of the blood with young cells liberated by the activity of the leucopoietic system."

A. G. B.

YOUNG (William John). **Observations upon the Body Temperature of Europeans living in the Tropics.**—*Jl. Physiology*. 1915. May 12. Vol. 49. No. 4. pp. 222–232.

The conclusions reached are as follows :—

"1. The temperature of the mouth of Europeans living in the Tropics is often considerably lower than that of the rectum, and this difference is generally much more marked after exercise just as in temperate climates. The temperature of the mouth is thus not reliable as a measure of the body temperature.

"2. During complete rest the rectal temperature did not show any marked variations from the limits of temperature observed in Europe.

"3. A considerable rise in the rectal temperature was produced by slight muscular work, and this was usually maintained for some time after the work had ceased.

"4. The high rectal temperatures observed throughout the day were due solely to muscular exertion."

Alluding to previous observations in the tropics the author says that in most cases the temperatures were taken in the mouth or axilla and only in a few cases in the rectum, most observers having assumed that in a warm and moist atmosphere the temperature of the mouth may be taken as a reliable index of the internal temperature of the body. His figures show however that this is not the case.

The paper contains "observations upon the temperature in the rectum, mouth, and in some cases the urine of six white persons (males) living on the coast of Queensland in latitude 19° 8' S., the object being to ascertain the daily variations which occur in white people living an ordinary active life in a tropical climate with a high degree of humidity."

HALDANE's observations, made in mines and Turkish baths, showed that the determining factor in body temperature is the absolute temperature of the wet bulb thermometer. In Townsville, where the observations were made, between November and April the wet bulb thermometer seldom falls below 70° F. in the day time and on many occasions rises above 80°. The subjects of the experiment were the Institute staff, engaged in laboratory occupations. The results are expressed in a series of tables.

After exercise the difference between the mouth and rectum temperature might amount to as much as three degrees. Referring to the work of CHAMBERLAIN [this *Bulletin*, Vol. 3, p. 224], who relied on mouth temperatures, the author thinks it improbable that the figures obtained are of much value as a true indication of the internal temperature of the body, especially those taken immediately after drill. With regard to the upper limit of a normal temperature, fixed by HALDANE as "certainly not below  $101^{\circ}$ ," the author states that this figure was obtained in the rectum of two subjects on several occasions without any special exercise having been performed.

A. G. B.

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## BOOK REVIEWS.

BRUTO da COSTA (B. F.), SANT'ANNA (J. F.), dos SANTOS (A. C.) & de ARAUJO ALVARES (M. G.). Translated by WYLLIE (J. A.), [F. R. G. S.]. *Sleeping Sickness. A Record of Four Years' War against it in the Island of Principe.*—xii + 261 pp. Roy. 8vo. With 75 plates and 3 maps. 1916. London: Baillière, Tindall & Cox. [Price 7s. 6d. net.]

Readers of this *Bulletin* and its predecessor, the *Sleeping Sickness Bulletin*, are familiar with the preventive work which has been done in the Island of Principe from the time of the Correia Mendes Mission, when MALDONADO's method of trapping tsetse flies was adopted [*Sleeping Sickness Bulletin*, 1910, Vol. 2, p. 26], to the recent announcement that *G. palpalis* has been exterminated in the Island and with it sleeping sickness [this *Bulletin*, Vol. 6, p. 166].

One must confess to some scepticism as to whether the word extermination is justified, but time will show, for it is improbable that the clearings will be kept up everywhere and, if flies still persist in any part of the island, they will presently multiply and become evident. But even in this case, the Sleeping Sickness Mission in their four years' war have accomplished a great work, on which they are much to be congratulated.

Principe has apparently been the only part of Africa in which the trapping of tsetse has had any marked success. But granted this success, it is not possible for outsiders to tell what part it has really played, for while the fly catching campaign was in progress the estates and their surroundings were being cleared of the vegetation which harboured the flies, and the wild pigs and other possible sources of blood supply were being hunted down.

The present book is a translation of the Portuguese memoir recently published in the *Archivos de Hygiene e Pathologia Exoticas*. It has already been reviewed in this journal [Vol. 6, p. 166] but in its English form merits more detailed notice.

Part I. opens with a history of the epidemic. Following the introduction of the tsetse fly, about 1825, the disease became serious in 1877, and since 1890 has been a "veritable scourge." A table shows that between 1902 and 1913 the average annual mortality from this cause was 5.6 per cent. of the population. The average general mortality in the same period was 15.5 per cent. The average population, all but some 400 being introduced labourers, the so-called *serviçaes*, was 3,800. An account is given of the two former Portuguese Missions, that of Annibal BERTENCOURT, which reported in a big volume in 1903, a passing visit only having been paid to this Island, and that of Correia MENDES, 1907-8, which laid the foundation for the work of the present Mission, and of which Dr. Bruto da Costa was a member.

The geography of the Island and the vegetation are discussed at some length. Its total area is 126 square kilometres or 30,720 acres, rather less than the Island of Jersey or about a third of the area of the Isle of Wight. Not more than 40 square kilos, 30 of which are covered with forest, is waste land; the rest is occupied by cacao plantations. The island is of volcanic origin, much broken up into heights and hollows, the highest peaks, in the south, rising to nearly 3,000 feet. There were numerous swamps before the recent operations, aggravated by the clayey nature of the soil. The mean annual temperature is 25.4° C. (77.7° F.), that for the hot and cold seasons respectively being 26.4° and 24.3°; in the south of the island the mean is two degrees less, and the climate is described as temperate. The rainfall is heavy.

The chapter closes with an account of *G. palpalis* in the Island. It is somewhat remarkable that San Thomé, which is only ten hours' steaming from Principe, has not been invaded, though the boats often carry live animals. Before the recent work the fly was ubiquitous in Principe, with the exception of altitudes above 800 feet, the southern portion alone

remaining free. This freedom appears to be due to its mountains and abrupt declivities, which do not favour the stagnation of surface water, and to its exposure to the southerly winds which, from June to September, are dry (*gravana*), or perhaps to the absence of pigs. The wild pigs, with which the flies had an "intimate association," numbered about 5,000. There are no crocodiles nor large lizards and "in various examinations of the stomach contents of glossinas" the authors never found nucleated red cells.

Part II. deals with the plan of the sanitary campaign and its execution. After an account of the legislative provisions and their application the authors come to the Official Sanitary Brigade and its work. It began with a force of 43, prisoners of war and delinquents sentenced to penal servitude, was slowly brought up, in the last year, to 300, and was at work for three years and a half. Each member received a fortnightly injection of atoxyl and "to this precaution may be attributed the small number of cases of infection among them, for between February, 1911, and August, 1914, only four men, out of four hundred or more who had served in the brigade, died of sleeping sickness. At this moment there are only seven sick among the ranks of the survivors." Here it may be doubted whether the authors are correct. Experiments have shown that the excretion of atoxyl is comparatively rapid. In the case of animals prophylactic experiments of the kind have failed and it is dangerous to assume that they would succeed in man. Unfortunately there are no details of the diet, condition of living, clothing, etc. of the brigade; such might throw light on the comparative immunity enjoyed. Nor is there any indication of the extent to which they were bitten. It is possible to work in *palpalis* areas and be very seldom attacked.

The chief steps taken were the clearing away of herbaceous and woody vegetation, the opening out to the sun's rays of the margins of water-courses and swamps, the straightening out and levelling of the banks and beds of these, the draining and filling of swamps, and forest fellings on a large scale. Two annual operations are advised—in the middle of the rainy season and at the end. The total area of land drained and reclaimed was 4 square kilos. Details are given. In one instance a tunnel was driven through a hill to drain a swamp. The area in which trees were felled exceeded 15 square kilos. As soon as the trees came down they were cut up into sections. The debris was rarely burned; its destruction was left to natural agencies; when such wood is burnt, "the secondary bush grows with an even greater rapidity and creates a more vigorous forest than if left to itself." Whether such is the case on the mainland the reviewer is unaware, but there are great objections to leaving timber on the ground, as has been found recently in Nyasaland [this *Bulletin*, Vol. 7, p. 111]. The trunks were cut at 40–60 centimetres above the ground. The stumps send out shoots in a very short time, "but if the precaution be adopted of cutting these shoots two or three times and stripping the stump of its bark, the tree dies, and the decomposition which sets in very soon works down to the roots." This should lessen the expense of clearing, because it has been recommended hitherto that the ground should be stumped. Trees were left at 6–8 metres interval on higher ground, 10–15 in sheltered positions.

The brigade, with the assistance of sportsmen, was responsible for the destruction of pigs, dogs, and civet cats. Of pigs 2,500 were slain by the brigade; at the end not more than twenty remained. Two thousand dogs and a still larger number of civet cats were accounted for. A cryptic reference is here made to the importance as a source of blood "attributed to the water-crow of the banks of the Victoria Nyanza."

Details are then given of the bird-lime method of trapping tsetse. [The sticky substance is referred to throughout as "viscus," which is surely nothing but the singular of viscera.] Its adoption was compulsory on every property and one man in ten of each gang of servants had to wear the sticky cloths. These were made of black serge lined with canvas and measured 40 by 50 centimetres. The fly catchers were grouped in twos, one behind the other; an illustration reminds one of the well-known advertisement of a certain paint. The most serviceable preparation was that put up by Tunbridge and Wright of Reading in tins of 5 kilos. A

fresh application had to be made daily. The men were told to take off the cloths when it rained and to fold them with the sticky side in. Nearly half a million tsetse were thus caught in 1911-13 [see the table published in this *Bulletin*, Vol. 4, p. 354]. Fixed cloths were useless.

All domestic animals in the island were examined three times for trypanosomes. Treatment was found useless and the infected ones were slaughtered. With regard to human beings 11,338 examinations were made by the thick film method, and 268 cases of trypanosomiasis were thus diagnosed. These were treated with double injections of atoxyl for at least four months and records of each case had to be kept by the planters. In November, 1913, 176 old patients were selected as showing no signs of disease and 78, having passed a careful examination, were repatriated to Angola or Cape Verde; later 43 more were released. Fifty-five remain. It is stated that preventive injections of atoxyl, following the bites of the flies, came to have a more current employment in the island than was at first expected; the reason was that the two injections meant two days off.

The total cost of this campaign was 156,982 escudos, or about £23,550 [escudo taken as 3s. 1d.], about seven parts of which were borne by the planters and six parts by the State. The items of expenditure are classed as—works in the field, fly catching operations, medical officers and hospital assistants, animals slaughtered, mechanical protection of dwellings, stables, etc., atoxyl—arranged in the order of costliness. The cost is worked out at 5.23 escudos per annum per hectare, about half of which was paid by the planters. The average net production is put down as 25 to 50 escudos per planted hectare. The authors go on:—

"It would be no exaggeration to reckon at 20 per cent. the increase in value of most of the properties in the island, through the improvement in their sanitary condition, and to count upon an increase at the same rate, in the near future, in their annual revenues, thus compensating for all the money spent on them."

It is estimated that the maintenance of the work will entail a "maximum annual burden of 8,000 Portuguese dollars," or £1,200.

Part III. is entitled "The Results of the Sanitary Campaign." Taking the records of capture of tsetse by the Maldonado method as an index, the authors give a chart, which shows the number of *Glossina* caught month by month in 1911, 1912, 1913 and 1914. In the first two years there is a great depression in the curve in the middle of the year, due to the *gravana* or dry south wind, followed by an abrupt rise towards the end. In 1913 instead of this rise there was a continuous fall, the curve almost reaching the base line at the end of the year, though the staff was increased in October. The record comes to an end in May, 1914. It is pointed out that the more important sanitary works were not concluded till the beginning of 1913. Similar curves are given for the larger estates. Summing up the results, the authors write:—

"The principal methods of attack employed against the glossina in the island were three in number; the clearing of the vegetation so as to let the direct rays of sunlight get at the soil and the air circulate freely around the clearing; the drying of the swampy lands; and the extinction of the animals who used to lend themselves to the feeding of the insect.

"The direct hunting of the insect by means of sticky cloths has never, by itself alone, proved a measure capable of reducing appreciably its numbers in the places it mostly frequents, and still less can it be relied on to effect its extinction from the island. The value of the MALDONADO process lies principally in the protection it affords to the workers in the more dangerous places, and in the index it affords, within limits, of course, to the frequency of the glossina in the particular area dealt with, and to the efficacy of the other measures put into practice against it. By itself, within practical limits, inasmuch as it is comparatively expensive on account of the great number of men it demands, it must be an offensive weapon of very slight value, and unlikely to give any very definite result."

This clear pronouncement has been long waited for. There was reason to think that the members of the previous Mission considered this method of no little importance in the campaign. It now shrinks to its proper proportion. The cutting of the vegetation was the most effective method,



as has been found everywhere else, but the authors lay stress on the value of the extinction of the animals on which the fly fed. It is pointed out that when the cleared lands became again covered with scrub and jungle it was noticed that only those places became alive with *Glossina* to which the wild pigs returned.

Later in the book an "elongated variety" of *T. gambiense*, obtained from a patient in the Island, is described. The Correia Mendes Mission described a dimorphic trypanosome common in the mammals of the Island, which they suggested was *T. pecaudi*. This is judged from the description and comparison of specimens to be identical with the above variety of *T. gambiense*, a conclusion of much significance if it is correct.

As to the progress, or regress, of the disease, microscopic examinations in 1908 showed 26 per cent. infected; in 1911, 17 per cent.; in 1913, 7.7; and in 1914, some cases having been sent to Lisbon and old cases repatriated, 0.66 infected persons remained in the Island. A chart shows the general mortality and the mortality from sleeping sickness from 1902-14. With two temporary checks the general mortality curve comes steadily down from 221 per mille to 69 per mille and the sleeping sickness curve follows it, showing, as would be expected, how much the latter has contributed to the former. The other causes of death are discussed, with figures, and it is concluded that they have not diminished in the same way.

Part IV. deals with the sanitary future of Principe. While the authors write that "it can hardly be supposed that a single living specimen [of *G. palpalis*] remains in the island" and no cases of sleeping sickness have been diagnosed since the first six months of 1913,\* they realize that more is required if what has been won is to be retained. They think that two of the members of the Mission may now be dispensed with, and the brigade reduced to 60 men and a European overseer, and that after six more months the medical and sanitary duties might be transferred to the two medical officers of the island. They indicate the main provisions of a law which they desire to see passed, from which it is evident that they are not unprepared to find the tsetse fly again becoming evident; e.g. they would prohibit pig breeding, and allow no thick forest to exist under 200 metres elevation.

The rest of this part deals with general sanitation, the authors observing that the death-rate is still very high. They deal in turn with the housing of the servigacs on the estates, their diet, disposal of faeces, rules affecting labour, alcoholism, medical attendance, malaria, inspection at port of embarkation, vaccination, and imported infectious diseases. Under housing, they note that influenza, pneumonia and pulmonary tuberculosis cause an annual mortality of 10 per mille, which they attribute mainly to common dormitories and their imperfect ventilation. They note that marriage is as a rule not permitted; this they regard as a mistake. They suggest better arrangement of the barracks and separate dwellings for married couples. Dejecta are dropped indiscriminately; latrines are almost unknown; intestinal worms are a frequent cause of admission to hospital. They suggest latrines on the dry earth trench system, the extensive use of thymol and the prevention of ground itch by some form of foot-gear, which would also prevent small wounds that often result in large intractable ulcers. For malaria they advise quinine prophylaxis, which also they think would lessen the incidence of leg ulcers.

Part V., by Dr. J. Firmino SANT'ANNA, deals with the species of trypanosomes found in the island, the blood-sucking insects, and the intestinal flagellates seen in *G. palpalis* and in Tabanids. An appendix gives an Order in Council, dated June, 1915, embodying the recommendations of the Mission for keeping Principe free from sleeping sickness. Large scale maps show the former foci of *G. palpalis*, the areas treated by the different sanitation measures, and the percentage of infection in the five zones, into which the island was divided, in 1909, 1911, 1913 and June 1914 respectively. The book is profusely illustrated with photographs, which give a good idea of the vegetation. There are also several coloured plates of trypanosomes.

\*In a note at the end of the book it is stated that two cases were detected in September 1914; both had been in residence four years.

This work is a valuable contribution to the literature of the prevention of sleeping sickness and the details should prove most useful to sanitary officers engaged in this task in our African possessions. While one must not forget the three special conditions of Principe—that its area is small, that it is an island and hence completely cut off from other fly areas, and that the native inhabitants are more completely under control than is the case in many parts of the mainland—the achievement of the Bruto da Costa mission is a great one, of which the planters will reap the benefit in increased production and decreased expenses of management.

The translator has done his work carefully but there are obscurities in places, doubtless due to his unfamiliarity with the technical terms.

A. G. B.

AUSTRALIAN INSTITUTE OF TROPICAL MEDICINE. Collected Papers.  
No. 1. 1914. Townsville.

The Collected Papers of the Australian Institute of Tropical Medicine, Vol. 1 of which has recently been issued, consist of nineteen reprints of varying format bound together. Half of these have been noticed in this *Bulletin*; the rest are chiefly zoological and deal with helminths and mosquitoes. The authors are A. BREINL, H. PRIESTLEY, S. J. JOHNSTON, W. NICOLL, T. H. JOHNSTON, F. H. TAYLOR, W. J. YOUNG and J. W. FIELDING. It is convenient to have the papers in this form, as many were published in journals which are not readily accessible.

A. G. B.

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## TROPICAL DISEASES BUREAU.

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## HELMINTHIASIS.

LEIPER (Robert T.). **Report on the Results of the Bilharzia Mission in Egypt, 1915.** [Part 3.]—*Jl. R. Army Med. Corps.* 1915. Sept. Vol. 25. No. 3. pp. 253-267. With figs. 41-55.

This paper, which is the third part\* of the Report of the War Office Bilharzia Mission, deals with the development of the miracidium in the intermediate host, the penetration of the definitive host and the development in the definitive host. The writer describes the development in the intermediate host as follows :—

"The Bilharzia miracidium gives rise to a sporocyst, which in turn produces daughter-sporocysts. After leaving the mother-cyst, the daughter-sporocysts migrate into the tissue of the digestive gland and grow rapidly. They become greatly elongated and eventually ramify throughout the organ, so increasing its bulk that an infected *Planorbis* can be detected at a glance. The colour also of the organ is changed. In *Planorbis boissyi* the digestive gland is dark brown or black, but when infected this changes to ochre. The ends of the daughter-sporocysts are solid, but the walls of the tubular bodies are very delicate and transparent, so delicate that it is impossible to dissect a complete sporocyst free from the tissues. As the cercariae develop within them, the sporocysts may become markedly constricted by the host tissue, and a certain amount of multiplication may possibly occur through fission. These sporocysts appear to absorb their nutriment through their walls, as they have neither oral sucker nor alimentary canal. The glandular tissue of an infected organ disappears apparently through pressure atrophy. The sporocysts are capable of travelling by wriggling movements. The cercariae leave the sporocysts through simple rupture of the over-distended wall. They are discharged from the mollusc in 'puffs,' a number being periodically shot into the water. This discharge occurs quite independently of the passage of faeces by the snail.

"In Bilharzia as in all digenetic trematodes the terminal phase of development in the intermediate host is the cercaria, and this alone is the infective stage."

[\*The first two parts were summarised in this *Bulletin*, Vol 6, pp. 437-442. Some of the illustrations reproduced here were published with those parts.—ED.]

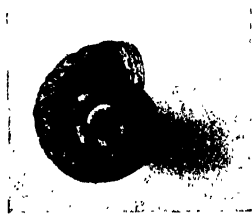
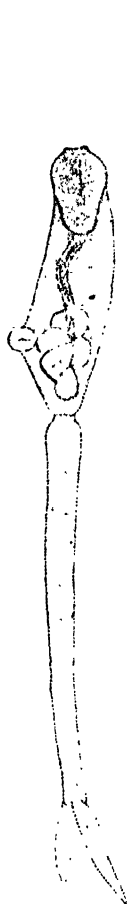
Fig. 1A. *Bullinus cortortus*.Fig. 1B. *Planorbis boissyi*.

Fig 2.

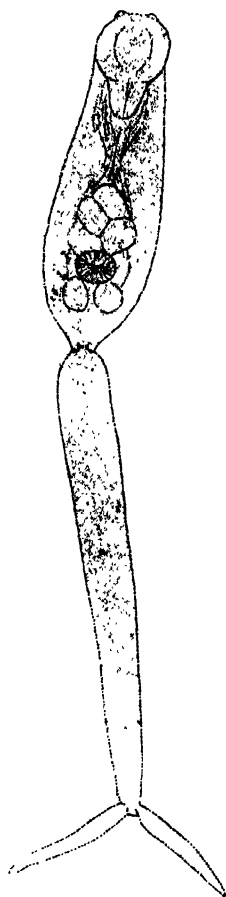


Fig. 3.



Fig. 4.

Various *Bilharzia* cercariae found in molluscs around Cairo.

A short description of the *Bilharzia* cercaria is given, and Leiper cites as diagnostic characteristics its possession of a bifid tail without cuticular keels and the absence of a muscular pharynx and pigment eye-spots. Having both a bifid tail and a ventral sucker, this cercaria must, according to LÜHE's classification of the cercariae, be placed in the *Furcocercous* group. Regarding the penetration of the skin and mucous surfaces by the cercaria, the writer reiterates some of the experimental evidence which was given in a former part of the Report.



FIG. 5

Sections of skin of a newly born mouse which had been immersed for half an hour in water containing large numbers of *Bilharzia cercariae*.



FIG. 6.



He considers that the cercariae are attracted by the warmth of the body as only a "slight degree of penetration" of the skin, by the cercariae, took place when a dead mouse was immersed in fluid containing them. This was in marked contrast to the readiness with which the cercariae penetrated the skin of a living animal. In this latter case the fluid, which at the commencement of the experiment was "full of *Bilharzia cercariae*," was found to contain "only a few cercariae and a large number of *detached* tails" half an hour later. The development in the definitive host is characterised by gradual growth and the parasite undergoes no further metamorphosis. As growth proceeds the various organs become differentiated, and the recognition of the sexes becomes possible at an early date. The males being "recognisable from the females by their greater breadth and the stouter formation of the ventral sucker." The route taken by the parasite in its journey from the skin to the portal system was still being investigated when the Report was written. Some excellent figures illustrate the text, and the Bibliography of Bilharziasis is completed in this part.

R. P. Cockin.

LEIPER (R. T.). **On the Relation between the Terminal-spined and Lateral-spined Eggs of *Bilharzia*.**—*Brit. Med. Jl.* 1916. Mar. 18. p. 411.

In this note Leiper states that there are marked differences in the *Bilharzia* worms producing terminal and lateral-spined eggs. These differences may be conveniently summarised thus :—

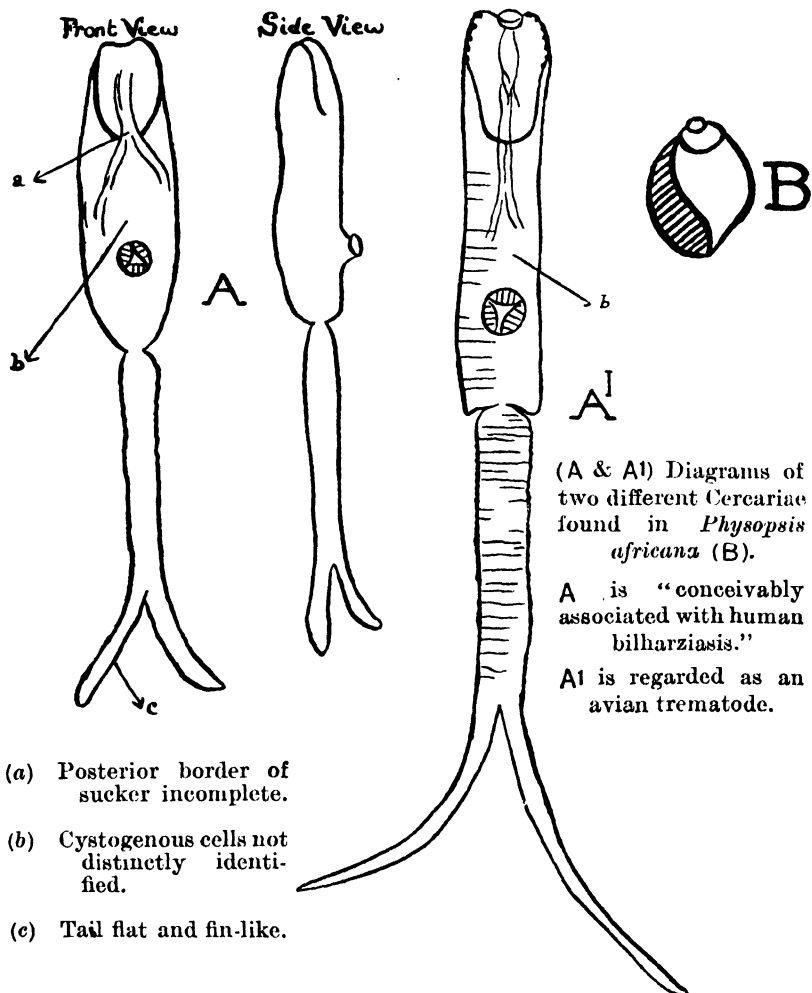
	Terminal-spined ova.	Lateral-spined ova.
1. Mollusc acting as intermediate host.	1. <i>Bullinus contortus</i> , or <i>Bullinus dybowskii</i> .	1. <i>Planorbis boissyi</i> .
2. Adult males. a. Testes. b. Terminal caecum.	2. a. 4 or 5 large testes. b. Short, owing to lateral caeca uniting late.	2. a. 8 or 9 small testes. b. Long, due to lateral caeca uniting early.
3. a. position of ovary. b. uterus.  c. Position of yolk-glands.	3. a. Posterior half of body. b. Long and containing many terminal-spined eggs. c. Limited range in the posterior quarter of the body.	3. a. Anterior half of body. b. Short and invariably containing only one lateral-spined egg. c. Extensive distribution over the posterior two-thirds of the body
4. Species.	4. <i>Schistosomum haematobium</i> ( <i>Sensu stricto</i> ).	4. <i>Schistosomum mansoni</i> (?)
5. Patholog. lesions.	5. Vesical bilharziasis.	5. Rectal bilharziasis.

The writer also calls attention to differences which characterise the cercariae, both in regard to the sucker and the length of the tail.

R. P. C.

- CAWSTON (F. G.). i. **Schistosomiasis in Natal.**—*Jl. Trop. Med. & Hyg.* 1915. Nov. 15. Vol. 18. No. 22. pp. 257–258. With 4 text-figs.\*  
 ii. **Bilharziosis in Natal.**—*Brit. Med. Jl.* 1915. Nov. 20. p. 746.  
 iii. **Bilharziosis.** [Correspondence.]—*Lancet.* 1915. Dec. 25. p. 1427.

In the above articles Cawston describes the results of the attempts which he has made to work out the life history of *Schistosomum haematobium* in Natal. Throughout his work he used only the terminal-spined ova obtained from a case of vesical bilharziasis, which was



under his care; and he notes that "lateral-spined ova do not occur, as far as I am aware, in the locality in which these experiments were conducted." In co-operation with Dr. WARREN (the Director of the

\*[Dr. Cawston has substituted the above illustrations for those which accompanied his paper in *Jl. Trop. Med. & Hyg.*]



Natal Government Museum) fresh-water snails, collected from a known-infected pool, were submitted to infection with the miracidia from these ova. A month later Dr. WARREN reported that he had discovered sporocysts containing bifid-tailed cercariae in the liver of one of these snails [*Physopsis africana*.] The cercariae were similar to those described by LEIPER and ATKINSON [see this *Bulletin*, Vol. 6, p. 296], and were possessed of two suckers—oral and ventral—and a bifid tail, which “showed no indication of cuticle covering.” No pharynx was noted, and pigment spots were absent.

Cawston suggests the name of *Cercaria secobii* for this form.

Cawston subjected a guinea-pig and a mouse to the “washings” obtained from the infected snails, for half an hour a day for three days. The mouse, however, escaped before the experiments were completed. The guinea-pig, which died six weeks after the attempted infection, had a good deal of free fluid in the peritoneal cavity at the post-mortem examination, but no bilharzia worms were found in the blood vessels.

The author recommends the removal of decomposing reeds from bathing pools, with the object of affording fewer sites for the development of the intermediate host. Treatment of vesical bilharziasis, by the author, has not been attended with great success; and he considers male fern and lavage of the bladder to be useless. He believes diuretics and urinary antiseptics to be of value in so far as they prevent bacterial complications.

In the *British Medical Journal* article it is stated that “bilharziasis in cattle has not been demonstrated in Natal.”

R. P. C.

BRISCOE (John Frederick). **Bilharziosis.** [Correspondence.]—*Lancet*. 1916. Jan. 15. pp. 155–156.

This note concerns twenty cases of vesical bilharziasis which were under the writer's observation during the Boer War. The patients were principally from the Argyle Regiment and had been stationed in the Rustenburg District of South Africa. The ova found in the urine were uniformly terminal-spined. The faeces were not examined microscopically for ova. The various forms of treatment employed included iron, male-fern, methylene blue and various urinary sedatives. In one case lavage of the bladder with quinine solution [strength of solution not stated] appeared decidedly beneficial.

Owing to the discharge of the patients, as “medically unfit for further service,” the writer was unable to pursue investigations regarding the life-history of *S. haematobium*, which he had contemplated.

R. P. C.

JOB (E.). **Note sur la bilharziose au Maroc.**—*Bull. et Mém. Soc. Méd. des Hôpit. de Paris*. 1915. Dec. 30. 3 ser. 31 Ann. No. 39–40. pp. 1282–1288.

In a period of thirty-one months Major Job states that he has met with thirty-four cases of bilharziasis at the Military Hospital at Casablanca. The majority of these cases occurred amongst the black troops, and he is of opinion that the disease has been introduced into Morocco by them. Up to the present time, only five cases have been

noted amongst the Europeans. The greater portion of the cases were suffering from vesical bilharziasis, and rectal symptoms were only recorded on three occasions.

The author notes five cases in which bilharzia ova were found in the faeces. In only one of these were the ova furnished with the lateral spine. All the other cases, both vesical and rectal, displayed the terminal-spined ova of *S. haematobium*.

Major Job calls attention to the presence of albuminuria in latent vesical bilharziasis, and emphasizes the value of this symptom in the detection of these latent cases in Senegalese troops.

Regarding the escape of the Miracidium from the ovum, the author observes that dilution of either urine or faeces with water is not essential. In an undiluted specimen of urine [apparently of very low specific gravity and only slightly coloured] he noted the miracidia escape from the ova, the free-swimming miracidia and the empty egg-shells. On another occasion, whilst searching for amoebae, he saw miracidia moving freely in a fluid stool. Concerning treatment, the author considers that it, at present, must be purely symptomatic. He gave intravenous injections of neo-salvarsan (0.6 gm.) in two of his cases and found this treatment quite ineffective.

R. P. C.

BOUILLIEZ (Marc). *Les bilharzioses dans le Moyen-Chari (Territoire du Tchad). Recherches expérimentales.*—*Bull. Soc. Path. Exot.* 1915. Oct. 13. Vol. 8. No. 8. pp. 604-610.

Bilharziasis—both vesical and intestinal—appears to be widespread in the whole of those districts to the east and south-east of Lake Chad, and especially is this found to be so in that area drained by the River Shari.

Statistics as to the degree of its incidence are, however, unreliable; as the types of the disease are generally benign and it is rarely that medical aid is sought.

Dr. Bouilliez has been fortunate in obtaining an indication of the probable degree of incidence in his examination of the scholars at the recently opened school at Fort Archambault. His examination of the thirty-two scholars—who were drawn from the principal villages around—was made eight days after the school was opened, and resulted in his finding twenty of them with ova in the urine and one only with eggs in the faeces.

The terminal-spined eggs of *S. haematobium* were found in all the vesical cases, with one exception. In this latter case, repeated examinations of both the urine and faeces were made, and each time the lateral-spined ova of *S. mansoni* were noted in the urine; and the result of the examination of the stools was invariably a negative one. With the material at his disposal Dr. Bouilliez made a series of attempts to bring about the direct infection of various animals. These results were uniformly negative.

In testing the resistance of the ova to weak solutions of hydrochloric acid, he found eggs containing living embryos after 6-8 hours' exposure to a one per thousand solution of the acid.

Neosalvarsan and emetine hydrochloride were used, with a view to testing their efficacy in the treatment of this infection, but no definite results were obtained.

R. P. C.

BAUJEAN. **Sur un cas de transmission de bilharziose intestinale.**—*Bull. Soc. Méd.-Chirurg. Indochine*. 1915. July. Vol. 6. No. 7. pp. 248-253.

The possibility of the direct transmission of intestinal bilharziasis from husband to wife is assumed by the writer of the above article; and the following deductions are drawn from his observations on the case:—

1. That, since Madame X had resided for thirteen years in non-endemic localities—France, Tonkin and Cambodia—and had not during that period, or previously, manifested any symptoms of the disease; and as the only infecting agent known in those localities was her own husband, therefore she acquired the disease by direct transmission from him and not from any outside medium.

2. That *Schistosomum mansoni* has no need of an intermediate host (mollusc, fish or other) for the completion of its evolution. [Recent observations on the life history of *S. mansoni* do not confirm these conclusions.]

R. P. C.

CHENHALL (Wm. T.). **Bilharziosis, complicated by Adeno-carcinoma of the Female Bladder.**—*Med. Jl. of Australia*. 1915. Oct. 15. Vol. 2. 2nd Year. No. 16. pp. 359-360.

This paper gives the clinical, surgical and pathological notes on a case of vesical bilharziasis occurring in a ship's stewardess, who had been sailing from Java to Singapore, and who was admitted into the Royal Hospital for Women, at Sydney, in the early part of 1914.

The case terminated fatally, and, at the post-mortem examination, an adeno-carcinomatous growth, about the size of a walnut, was found surrounding the vesical portion of the urethra.

Extensive infiltration of the bladder wall and marked enlargement of the right kidney and ureter were also noted.

[Professor FERGUSON, of the Kasr-el-Ainy Medical School, Cairo, has called attention, on several occasions, to the relative frequency of this complication in vesical bilharziasis. The importance of the paper appears to lie rather in the fact that infective cases of this disease are being imported into Australia.]

R. P. C.

REED (Alfred C.). **Schistosomiasis japonica.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1915. Nov. Vol. 3. No. 5. pp. 250-273.

In the account of Asiatic schistosomiasis, which is given by Reed in the above article, attention is called to the fact that the disease is spreading in the localities in which it is endemic, and that it is now to be regarded as a menace to Western countries.

The endemic areas referred to are five of the provinces of China, which form part of the Yang-tze basin—Hunan, Honan, Hupeh, Anhwei and Kiangsi—and four of the provinces in Japan—Yamanashi, Hiroshima, Okayama and Saga. In addition to these there are smaller foci of infection scattered throughout Japan and around the infected regions of China, and an infective focus undoubtedly exists in the Philippine Islands. [WOOLLEY has reported one case of this disease occurring in a Filipino, who had never left the Islands.]

Cases imported into both England and the United States, from endemic areas, have been reported in the past; but so serious a view, in regard to the possibility of the introduction of the disease into the latter country is taken that Public Health Regulations have been drawn up (and are in force), which exclude further cases, where such occur in immigrants, and arrange that in the case of citizens "such quarantine oversight as will secure absolute disinfection of the stools" is enforced.

The author gives the clinical and pathological features of the disease, and a description of the parasite producing them. Regarding the incubation period in this disease, the author observes that, whilst this is usually given as from ten to fifteen days, LANNING notes it to lie between twenty-four and forty-eight hours. LANNING's observations were carried out on seven cases of the disease, which occurred amongst the sailors of the United States gunboat "Quires" (which was on patrol duty on the Yang-tze Lake) and which thus afforded him an excellent opportunity for exact and close observation. Notes on nine cases of the disease, admitted to the Yale Hospital, Changsha [which stands on a tributary of the Yang-tze River, to the south of Lake Tong-ting, in the province of Honan] in the year ending 1st May, 1915, are given. All were in Chinese subjects. The bibliography of the disease, up to August, 1914, is included in the article.

[This article appears to have been written previous to the publication of MIYAIRI and SUZUKI's researches on the life-history of *Schistosomum japonicum* and, consequently, of LEIPER and ATKINSON's confirmation of their results.]

R. P. C.

ASCANIO RODRIGUEZ (J. B.). *Sobre un caso de Bilharziasis hepatica.* [A Case of Bilharziasis of the Liver.]—*Gaceta Med. de Caracas.* 1915. Vol. 22. No. 19. pp. 147-149.

An account of two cases, in which the symptoms consisted principally of tenderness with enlargement of the liver, and diarrhoea, followed by a fatal result from collapse. In the first case, which occurred in private practice, an autopsy was not obtained, so that the diagnosis remained somewhat in doubt. The symptoms, however, were extremely similar to those of the second one. In the latter, the patient was a man, aged 35 years, who three years previously had been taken with hectic fever, pain and tenderness of the liver, along with diarrhoea which was attributed to the presence of piles. A recovery was made from these symptoms more than once. In a second attack there was also cystitis with the passage of blood, for some days. The patient was treated by his then medical attendant with emetin, upon the supposition of amoebic dysentery and hepatitis. Finally he was admitted to hospital under the care of the author of the present paper and was placed upon expectant treatment. The stools showed no amoebae or flagellates, but on the other hand large numbers of ova of *Uncinaria* and *Bilharzia mansoni*. The urine contained bile pigment, but no ova or albumin. The patient died quietly in his sleep one night, before further treatment could be undertaken. At the autopsy, the portal vein was ligatured and removed,

entire, and in the contained clot were found a large number of living *Bilharzia* of both sexes. The blood that escaped into the abdominal cavity, when diluted with normal salt solution and centrifuged, did not furnish any examples of the parasite. Ova of *Bilharzia* and three miracidia were found in smear preparations of liver substance. In the bile no parasites were found.

J. B. Nias.

ARCE (Julian). **La Paragonimiasis en El Peru.** [Paragonimiasis in Peru.]—*Cron. Méd. Lima*. 1915. Oct. Vol. 32. No. 628. pp. 249-254.

Paragonimiasis has increased considerably in Peru of recent years, according to the author of this paper, through the immigration of Chinese, and more especially of Japanese, workers. Alberto BARTON demonstrated in 1910 the existence of the first case in a Peruvian, who had superintended the work of a gang of 45 Japanese coolies, and three years previously recognised the disease in a Chinese stoker. The author has also met with three cases recently in his own practice, one of whom had been in contact with Chinese and Japanese coolies, and he therefore recommends that a quarantine should be instituted for the detection of this disease, amongst others, for all such arrivals.

J. B. N.

CORT (William Walter). **Egg Variation in a Trematode Species.**—*Jl. of Parasitology*. 1915. Sept. Vol. 2. No. 1. pp. 25-26.

Whilst working on the anatomy of *Pneumonoeces similiplexus* from the lung of *Rana pipiens*, the author measured more than two hundred eggs, from ten different individuals, with a view to the accurate determination of the average egg-size for the species. The range of variation was from  $34\mu$  to  $40\mu$ ; and the average  $37.6\mu$ .

At a subsequent examination of three specimens, from a frog from Oshkosh, Wisconsin, the author was struck by the apparent smallness of the eggs, and upon measuring two hundred of the eggs from these individuals, he found the range of variation was  $30\mu$ - $37.4\mu$ , whilst the average egg length worked out at  $34.2\mu$ .

Apart from the difference in the size of the ova the rest of the characters used for specific diagnosis were identical in both groups of flukes.

The author points out that "this observation shows that a distinct variation may occur within a species in a character which has proved to be generally constant."

R. P. C.

GAIDE & RONGIER **De la Sparganose oculaire en Annam.**—*Bull. Soc. Méd.-Chir. Indochine*. 1915. Mar. Vol. 6. No. 3. pp. 93-95. With 1 plate.

Drs. Gaide and Rongier publish here the notes on two cases of undoubted, and one probable case of, ocular sparganosis which have come under their notice at the Central Hospital at Hué. [Hué is the capital city of Annam.]

They make the following observations :—

1. Ocular sparganosis occurs in Annam, where it was unrecognised until Dr. CASAUX called attention to the prevalence of the infection in the Tonkin delta.

2. The sparganum may be found encysted in other regions, around the eye, than the upper lid, and is not necessarily restricted to that specific site.

The authors wish to call attention to the possibility of the parasite occurring elsewhere in the body, as established by MANSON, SCHEUBE, IJIMA and MURATA.

R. P. C.

CASAUX (J.). **A propos d'un nouveau cas (8<sup>e</sup>) de Sparganose oculaire.**

—*Bull. Soc. Méd.-Chirurg. de l'Indochine*. 1914. Nov. Vol. 5. No. 9. pp. 374-377. With 1 plate.

In a communication made to the Congress of Tropical Medicine, at Saigon, Dr. Casaux called attention to the frequency with which ocular sparganosis was encountered in the vicinity of the Tonkin delta.

This report was based upon seven cases of this affection which had come under his observation, and the present article deals with an eighth case which he has since treated.

The infection manifests itself by pain, redness and lachrymation of the eye, associated with extreme ptosis of the upper lid. This latter, which is swollen and oedematous, reveals on palpation the presence of a small indurated nodule, the size of an almond.

Incision of the skin over this tumour brings into view a small mass of yellowish fatty tissue, which upon section opens up a small central cavity in which the larval cestode lies. The parasite found, in each of Dr. Casaux's cases, has been identified as *Sparganum mansoni* and an excellent description of this worm is given. The conclusions arrived at by the author are :—

1. That there exists at Tonkin a, hitherto, unrecognised affection—“Ocular sparganosis.”

2. That this affection is characterised by :—

(a) The presence of *Sparganum mansoni* in the upper lid.

(b) The formation of fibrous nodules in the lid, which are produced by the activity of the parasite in that situation.

(c) Marked inflammatory reaction in the tissues of the surrounding parts.

R. P. C.

MASTERS (W. E.). **A Case of Tapeworm accompanied by Haemoglobinuria.**—*Lancet*. 1915. Oct. 23. p. 922.

The author, writing from the Belgian Congo, describes the symptoms and treatment of a young Belgian who was the subject of a Cestode infection, but who, during convalescence, developed haemoglobinuria which terminated fatally.

In the opinion of the writer this latter complication was precipitated by the patient's indiscretion in taking a large dose of alcohol, at a friend's house, during a clandestine visit; and, it is suggested that “the alcohol, together with the unexcreted male fern, acting upon a weakened constitution, freed the latency to haemoglobinuria.”

R. P. C.

FOSTER (Winthrop D.). **Two New Cases of Polyradiate Cestodes, with a Summary of the Cases already known.**—*Jl. of Parasitology*. 1915. Sept. Vol. 2. No. 1. pp. 7-19. With 4 text-figs.

In the two new cases of polyradiate cestodes, which Foster describes, one is a tetradiate form of *Taenia saginata* and the other a triradiate form of *Taenia pisiformis*. In neither case was the head present.

A tabular list of all the cases of Polyradiate Cestodes, which have been recorded to date, is given, and of these twenty-four (of the forty-four cases in the list) adult specimens of *Taenia saginata* display this anomaly. Amongst these twenty four specimens is one pentaradiate form [ROSENBERGER, U.S.A., 1903] and one tetradiate form [FOSTER, U.S.A., 1915]. The remaining twenty-two are triradiate throughout the entire length of the strobila. The author points out that "with but one exception [RUDOLPHI, 1810, in *Dipylidium caninum*] all triradiate cestodes, in which the head has been recovered, have been found to have six suckers instead of the usual four; the triradiate feature extending throughout the scolex." In the majority of adult cestodes displaying this anomaly the head has, however, not been recovered.

Feeding experiments, carried out on a rabbit, with two proglottides of the triradiate *Taenia pisiformis* "tend to show that perfectly normal cysticerci may result from abnormal adults."

R. P. C.

BARLOW (Nathan). **Hookworm Work at Cuyamel [Honduras].**—*New Orleans Med. & Surg. Jl.* 1915. Dec. Vol. 68. No. 6. pp. 370-375.

The hookworm is stated, by the author, to be responsible for more economic difficulties with regard to native labour than all other causes combined, and the following percentages give its relative incidence at Cuyamel:—

" Hookworm is present in natives 79·25%, negroes 54%.					
Trichocephalus	"	"	"	49·00%	" 47%
Ascaris	"	"	"	44·50%	" 40%."

[The number of cases which were examined, in order to arrive at these percentages, is not given.]

The writer states that "every native, or negro, free from malaria or other diseases causing anaemia, who has a haemoglobin percentage of, or less than 60 per cent., has hookworm." He states that the only other common diseases which would produce this degree of anaemia at Cuyamel are malaria and protozoal dysentery, and that "tuberculosis, cancer, leukaemia, syphilis, etc., are comparatively rare in Honduras."

The article also contains "Directions for a practical Anti-hookworm campaign in connection with Tropical corporation work," which suggest that an accurate knowledge of the percentage incidence of the different intestinal parasites is essential. Determination of the other local, anaemia-producing diseases is also insisted upon as a preliminary measure.

The treatment advocated by the author, unless some contraindication exists, is as follows :—

<i>"On retiring :</i>	Calomel and Santonin	aa	grs. v.
<i>On rising :</i>	Magnesium sulphate	oz.	½.
<i>After action of saline :</i>	Thymol	grs.	lxxv.
(To be taken within half an hour).			
<i>One hour after Thymol :</i>	Magnesium sulphate,	oz.	½."

R. P. C.

BISHOP (William A.) & BROSIUS (O. T.). **Chenopodium in the Treatment of Uncinariasis.**—*Jl. Amer. Med. Assoc.* 1915. Nov. 6. Vol. 65. No. 19. pp. 1610-1613.

With a view to ascertaining the approximate value of chenopodium, as a vermifuge in the treatment of uncinariasis, the writers compared the results obtained from its use with those from cases treated with thymol, which is cited as "the standard anthelmintic" for this condition.

The cases used for the experiment were unselected and previously untreated cases of the disease, and the number of worms expelled in the first whole stool was taken as an indication of the comparative efficiency of the respective treatments. Sixty cases were treated with each drug and the number of worms were averaged and gave a yield of seventy-six in the case of thymol and ninety-nine in the case of chenopodium.

A further series of cases treated with chenopodium averaged a yield of 131 worms for ninety cases; and in one instance 1,379 worms were obtained from a first whole stool.

The writers summarise their conclusions as follows :

"1. The method of administration of chenopodium is simple, and is attended with less inconvenience and discomfort to the patient than with thymol. This would give the drug an important place in the field work in uncinariasis.

“ 2. Chenopodium can be given at shorter intervals than can thymol and a cure can thereby be more quickly established, which gives it a greater economic value.

“ 3. *Chenopodium* is nontoxic in therapeutic doses.

"4. *Chenopodium* is a more efficient vermifuge than thymol in the treatment of uncinariasis."

R. P. C.

**FORT (A. G.). Rural Sanitation and Hookworm Disease.**—*Amer. Jl. Public. Health.* 1915. Oct. Vol. 5. Old Series Vol. 11. No. 10. pp. 1038-1043.

Dr. Fort in the course of this paper discusses the relative values of betanaphthol, thymol and oil of chenopodium in the treatment of ankylostomiasis. In view of the fact that oil of chenopodium is non-toxic and as efficacious as the two former drugs, he is of opinion that a wider use of this drug is merited.

Economic reasons, such as the scarcity and higher prices of betanaphthol and thymol, lead him to the same conclusion.



He quotes Dr. GUTHRIE, of the Johns Hopkins Hospital, as advising the use of oil of chenopodium, in this disease, in the following fashion :—

*First day :* 5 p.m., Epsom salts, 1 oz. ; liquid diet begun.

*Second day :* 5 p.m., Epsom salts, 1 oz. ; liquid diet.

*Third day :* 6 a.m., Oil of chenopodium ℥ xvi, in capsule. A similar dose is repeated at 8 a.m. and 10 a.m. At 12 noon castor oil 1 oz. plus chloroform ℥ xlv is administered. No food is given until treatment is completed.

Dr. GUTHRIE comes to the following conclusions in regard to this mode of treatment :—

1. The treatment is well borne. No ill-effects were noted and no complaints of subjective discomfort were elicited.

2. The treatment was successful in both Necator and Ankylostome infections. "It sometimes had to be repeated, but it practically never failed to eliminate some worms or to reduce the number of eggs in the stool."

3. It succeeded in some cases in which thymol had been tried repeatedly and had failed.

4. "When given in parallel series, to patients as they came, the chenopodium seemed much more efficient than thymol."

5. "The drug is also very efficient for *Ascaris*, somewhat less so for whipworm, and often clears the stools of *Strongyloides intestinalis*."

R. P. C.

STILES (Charles W.). i. **Recent Studies on School Children, with Special Reference to Hookworm Disease and Sanitation.**—*New York Med. Jl.* 1915. Oct. 30. Vol. 102. No. 18. Whole No. 1926. pp. 906-907.

ii. **Zooparasitic Intestinal Infections. An Analysis of Infections found among 1,287 School Children (776 White, 511 Negro) of the City of X.**—*U.S. Pub. Health Rep.* 1915. July 2. Vol. 30. No. 27. pp. 1991-2002.

In order to gauge the extent of the influence of sanitation in certain rural and urban districts in the south of the United States, where hookworm disease is frequent, the author undertook the examination of a large number of school children. The children came from homes of two sanitary types—(a) Sewered, and (b) Privy.

The conclusion he arrived at was that those children coming from homes furnished with privy accommodation were more subject to intestinal parasites—both protozoal and helminthic—than those from homes provided with sewer accommodation.

Whilst this fact was established as a result of the investigation, the author does not claim that it is mathematically exact, since allowance must be made for the spread of various parasitic diseases—chiefly protozoal—by means of flies and the infection of food during its preparation.

He considers that "a privy has a radius of influence in every direction of the compass," and that the inhabitants of sewered houses may, by the proximity of a privy, be in as great danger of infection as those of the house in which the privy exists. "Hookworm Disease," he states, "is entirely due to bad sanitation," and its prevalence is an index of the sanitation of the district in which it occurs. The author points

out that good sanitation is a sound investment economically, since the cost of education per head is more in the case of poor children coming from insanitary homes, than in the case of those children who live under hygienic conditions in sewered homes. In consequence, a greater expenditure of money on sanitation would be reflected in a material reduction of the cost of education, together with a general improvement in the physical and mental well-being of the population.

A table showing the prevalence of the different intestinal parasites in the various sanitary groups is given in the second of the above papers.

R. P. C.

**STILES (C. W.). Memory Tests of School Children. Memory Span of 1,585 White School Children (751 Boys, 834 Girls) in the City of X.—U.S. Public Health Rep. 1915. Dec. 24. Vol. 30. No. 52. pp. 3738-3745.**

The children taking part in the memory test, recorded by Professor Stiles in the above article, were drawn from the white community in one of the Southern cities of the United States. The ages of the children ranged from six to seventeen years and the memory test employed was that devised by Professor E. K. STRONG.

The children were divided into the following sanitary groups:—

(a). Those coming from homes with sewer connection, but without privies (1,223).

(b). Those from homes with privy sanitation (271).

(c). Those from homes of which the sanitation was unknown (91).

The tabulated results show that those children coming from homes in group *a* average a higher memory span than those coming from homes classed in group *b*.

Of the series, 31.7 per cent. of the scholars submitted specimens of faeces for microscopical examination, and the memory span of the children displaying helminthic infection is compared with that of the children not so infected.

Professor Stiles arrived at the following conclusion in regard to the infected cases:—

“Light infections with hookworms (*Necator*), eelworms (*Ascaris*), *Lambliæ* or *Endamoeba coli* did not show any material effect in inhibiting the memory span of the children who were found to harbor these parasites, when their memory span was compared with the average of the children of their respective groups.”

He states, however, that “this conclusion cannot be extended at present to cases of severer infection with these parasites.” R. P. C.

**FAUNTLEROY (C. M.). Examination of Arriving Aliens for Uncinariasis at Honolulu. The Laboratory Equipment and Duties of Assistants; Collection of Specimens for Examination; Preparation of Microscopic Specimens; Rules for the Guidance of Assistants; Identification of Specimens; Examination of Slide Preparations; Further Examination and Treatment of Aliens certified for Uncinariasis.—Amer. Jl. Trop. Dis. & Prevent. Med. 1915. May. Vol. 2. No. 11. pp. 703-714.**

Under the Immigration Laws in force at Honolulu, uncinariasis is classed as a “dangerous contagious disease,” and no alien so infected is permitted either to land or to reside in United States territory.

The U.S. Immigration authorities do, however, undertake the treatment of certain infected aliens, when their general condition is good and disease affecting vital organs is absent. This treatment is carried out at the Immigration Station, and the drug employed for the expulsion of the parasites is thymol. A well-developed adult, without marked anaemia, receives a full dose of 60-80 grains, and for children is prescribed a dose which is regulated according to age and physical condition. After the treatment the immigrants are kept under observation at the Immigrant Station for some days, and the faeces are again examined for hookworm ova. In the event of ova being found, the treatment is repeated, and at a period later the faeces are re-examined. It is not until a negative examination results that the alien is given permission to leave the station. The method of examining the faeces of the aliens upon their arrival at Honolulu, and the care exercised throughout in regard to the identification of specimens are detailed. This is ensured by means of "identification tags," which are attached to the vessel containing the specimen through all the stages of investigation. This paper should be referred to by those whose duties entail the examination of large numbers of patients for hookworm disease.

R. P. C.

ROMERO (Felix). *Atralgia de origen unsinariásico*. [Arthritis of Uncinariar Origin.]—*Repertorio de Med. y Cirug.* 1916. Feb. Vol. 7. No. 5. [No. 77.] pp. 199-201.

An account of two cases of arthritic trouble which appeared to be due to the presence of *Ankylostoma duodenale*, and which subsided promptly on treatment directed to the parasite.

Case 1. A woman, aged 45 years, had enjoyed good health until 14 years previously. She then began to suffer from debility, pallor, dysmenorrhoea, and articular pains in the knees. She had never had chilblains. Upon examination the knee-joints were apparently ankylosed, and all the joints of the limbs were painful on movement. There were, however, no obvious signs of inflammation, or nodosities. The bowels were obstinately constipated. The heart presented a faint basic murmur, and there was tenderness along the course of the colon. A dose of 40 grammes of sulphate of soda was at once given, which produced a large action containing several specimens of *Ankylostoma duodenale*. Upon this indication the patient was at once treated with thymol and arsenico-ferruginous tonics, with the result that all the joint-symptoms quickly disappeared.

Case 2. A merchant, 40 years of age, who was pale, grey-haired, and suffered from difficulty in walking. The appetite was bad, and the patient complained of vague pains in different parts of the abdomen, which increased when he did not take pills to relieve his excessive constipation. When the bowels were confined, pains supervened in the knees and other joints, and much itching was felt at the anus. Upon examination the articulations were found to be very painful, but presented no signs of enlargement or effusion. These symptoms had lasted, on and off, for 20 years. After anti-rheumatic treatment had been employed in vain the author, recollecting the former case, tried thymol, with the result of producing ankylostoma in the stools. The arthritic symptoms immediately improved, though the patient subsequently suffered from relapses due to his mode of life, which were treated on the same lines.

J. B. N.

FERRIS (E.) & HEYMANN (P.). **Un cas d'occlusion intestinale due à la lombricose.**—*Bull. Soc. Méd.-Chirurg. Indochine.* 1914. Oct. Vol. 5. No. 8. pp. 332-336.

The authors of this paper record the case of a young soldier who was admitted into hospital, in a comatose condition, suffering from intestinal obstruction. The condition of the patient was desperate, and a laparotomy was performed without anaesthesia. At the operation a mass of ascarids was found to be obstructing the lower portion of the ileum for seventy-five centimetres of its length.

The ileum was opened at a distance of thirty centimetres from the ileo-caecal valve, and the worms, to the number of 253, were removed.

The patient, however, died.

At the subsequent post-mortem examination a further mass of thirty-four ascarids was discovered in the ileum and a group of five in the caecum. In the discussion on this case, Dr. PELLETIER cited one, which he had recently had under his care, in which the cause of an obscure peritonitis was found to be an *Ascaris* which had perforated a typhoid ulcer of the ileum.

R. P. C.

AYUSO y O'HORIBE (Hircano). **Hipotermias nocturnas de origen helmintásico. Caso clínico.** [Nocturnal Hypothermia of Helminthic Origin.]—*Revista Med. de Yucatan.* 1915. Oct. Vol. 10. No. 12. pp. 172-179.

Notes on the case of a child, aged 5 years, who was believed to be suffering from enteric fever. Throughout the case, nocturnal hypothermia was a marked feature, which persisted until santonin was given. This brought about the removal of large numbers of *Ascarids* and the child rapidly regained good health. The hypothermia disappeared with the other toxic features of the case upon removal of the worms.

R. P. C.

BARLOW (Nathan). **Clinical Notes on Infection with *Strongyloides intestinalis*, based upon a Series of Twenty-Three Cases.**—*Interstate Med. Jl.* 1915. Dec. Vol. 22. No. 12. pp. 1201-1208.

The twenty-three cases which form the subject matter of this paper were admitted to the Hospital at Cuyamel, Honduras, during a period of fifteen months. Of the series five were "pure" cases [i.e., were uncomplicated by any other infection or disease].

Four stages of the disease are described :—

1. *Stage of Invasion*: The perforation of the skin by the larvae, followed by redness and intense irritation.

2. *The Latent Stage*: "During which there is frequently a peculiar, irritable condition of the intestine, in which any laxative sufficient to act at all will produce a number of violent movements which leave the patient exhausted."

3. *The Stage of Diarrhoea*: The diarrhoea is of an intermittent character and is unaccompanied by pain or colic. "It is characterised by an inability to retain the stools for more than a few minutes." The stools are free from blood and mucus, unless the infection is complicated by the presence of haemorrhoids or dysentery. NORMAND considered Cochin China diarrhoea as being due to this parasite.

4. *The Stage of Neurasthenia*: The general characteristics of this stage are those of neurasthenia due to any cause. Emaciation, anorexia, vertigo, general weakness and other symptoms are also cited by the author as occurring in this stage.

Under the heading of "Special symptoms" the author mentions that arthritis, pneumonia, fistula in ano, haemorrhoids and peroneal paralysis have been recorded as being attributed to *Strongyloides intestinalis* infection.

Energetic treatment with large doses of thymol or male fern, or both in alternation, is recommended.

R. P. C.

**RODRÍGUEZ ARJONA (Vincente). Enteritis cronica y Tricocefalo dispar.** [Chronic Enteritis and *Trichocephalus dispar*.]—*Revista Med. de Yucatan*. 1915. Aug.-Sept. Vol. 10. No. 10-11. pp. 147-152.

In this paper the author calls attention to a severe type of chronic enteritis which is not amenable to ordinary methods of treatment, and in which attention to suitable dietetic treatment produces no improvement in the condition of the affected patient.

The author notes that, upon examination of the faeces of these patients, the ova of *Trichocephalus dispar* were invariably found to be present, and he attributes the enteritis and the many complications which he calls attention to, to the presence of the adult parasites in the intestine.

The only treatment which has been found of value in this *Trichocephalus* enteritis is the administration of thymol. It is recommended that this drug be given in two to three gramme doses (one gramme to each cachet) in the case of an adult, and in half-gramme doses (suspended in syrup) in the case of children.

The presence of badly compensated heart lesions is held to contraindicate the use of thymol in this condition.

R. P. C.

**KLEINE (F. K.). Die Uebertragung von Filarien durch Chrysops.** [The Transmission of *Filaria* by Chrysops.]—*Zeitschr. f. Hyg. u. Infektionskr.* 1915. Oct. 26. Vol. 80. No. 3. pp. 345-349.

This is an account of an investigation, carried out at Eseka in the Cameroons, regarding the transmission of *Filaria* by Chrysops. The inhabitants of the district in and around that in which the work was carried out are heavily infected with *Filaria loa*, and Chrysops and sand-flies abound.

Six hundred female flies were examined and, of these, five hundred were *C. dimidiata* and the remainder *C. silacea*. Of the whole number thirty-two were found to be infected—i.e. 5·3 per cent.—and in the case of nine of these infected flies the larvae were fully mature.

Development, according to the author's account, appears to take place in the fatty connective tissue surrounding the tracheae in the abdominal cavity, and it is to that site that the embryos converge when they first perforate the gut of their host. In the early stages the larvae remain motionless and it is not until their evolution has made marked advance that they commence to leave their position in the fatty connective tissue and to wander about the abdominal cavity. Later, they make their way to the cephalic end of the body ;

and, in two cases, the author was able to demonstrate the emergence of the larvae from the proboscis. This was carried out by placing the head, after removal, in a few drops of salt solution and observing under a low power of the microscope.

The size of the mature larva is given as being the length of the diameter of the field, when Ocular 2 and Objective AA are used with the tube drawn out to 160 mm.

[The Chrysops used in this work were, apparently, collected in a haphazard fashion, and the hosts upon which they had fed were, consequently, unknown. The nature of the larvae, therefore, would appear to be undetermined. Neither illustrations nor a description of the larva are given, and no attempt was made to communicate filarial infection by means of infected flies. The work must be regarded as incomplete.]

R. P. C.

NISBET (W. B.). *Note on the Infectivity of Filaria.*—*Med. Jl. of Australia.* 1915. May 15. Vol. 1. 2nd Year. No. 20. p. 449.

In this communication the author draws attention to what he suggests might be called "domestic infection" in filariasis. He considers that "the proportionate incidence of the disease, from 3 per cent. to 11 per cent., among the observed towns on the East Coast of Queensland, renders the chance of infection of two or more people living in the same house possible from different sources, and not directly from one to the other through an intermediate mosquito." In support of this contention he cites the following cases:—

1. Mr. B., who suffered from filariasis, died "from causes not connected with the parasitic disease," in 1907. His daughter, Miss B., aged 11, suffered from a transient lymphangitis in 1914, and an examination of the blood revealed the presence of microfilariae.

2. Mrs. C. was, in 1913, operated upon for an inflammatory swelling at the margin of the left breast. The wound subsequently discharged chylous fluid, and examination of the blood proved the presence of filarial embryos. Her husband, Mr. C., was recognised as an early case of elephantiasis in February 1915, and his nocturnal blood showed microfilariae in large numbers.

With regard to Case 1, the author considers that "there is no evident objection to the theory that Miss B's infection was obtained from the father, and had continued unobserved for eight or nine years."

In Case 2 it is suggested that "owing to the close domestic association it is reasonable to suppose that the one had infected the other." The author, however, admits that "the house was largely infested with mosquitoes."

R. P. C.

ANDRUZZI (A.). *Un caso di elefantiasi dello scroto e del pene, guarito con la fibrolisina.* [A Case of Elephantiasis of the Scrotum and Penis, cured with Fibrolysin.]—*Ann. Med. Nav. e Colon.* 1915. June. Anno 21. Vol. 1. No. 6. pp. 656-657.

The case of a sailor taken, apparently in the Far East, with an acute lymphangitis of the scrotum and penis which was diagnosed as being due to filariasis, though no filariae could be discovered in the blood. Daily injections of 2 cc. of fibrolysin solution, injected into the

gluteal muscles, as recommended by CASTELLANI, were given, to the number of 100 in all, with complete success. At the end of four months the patient was considered cured. The simultaneous local treatment of the parts by massage and elevation, recommended by CASTELLANI in the case of the limbs, was omitted.

J. B. N.

NICOLL (William). **On Worm Nodules in Calves: Some Negative Observations and Experiments.**—*Med. Jl. of Australia*. 1915. Dec. 4. Vol. 2. 2nd Year. No. 23. pp. 529–531.

Acting upon the suggestion of Dr. BREINL, the author of this paper undertook a series of experiments with a view to testing the hypothesis that “the larvae (of *Onchocerca gibsoni*) may occur in the blood, only during the early stages of infection, in young animals.” Ten calves, varying in age from five to eleven months, were used for the experiments; and these were, without exception, bred and reared on the Townsville Common. Upon this common seven or eight hundred head of cattle are usually grazing, and a large proportion of these are infected with nodules.

The experiments were carried out from January to July in 1915, during an abnormally dry period, and the author suggests that the abnormal conditions which obtained may have had some effect upon the results at which he arrived.

The technique of the experiments was as follows:—

The calf was brought in from the common early in the week and examined for worm nodules. These examinations were all negative. The skin of the neck was then shaved, and a cannula was inserted into the jugular vein and about 300 cc. of blood was withdrawn. This was received into an equal amount of a 3 per cent. solution of sodium citrate. The citrated blood was haemolysed by the addition of distilled water, and then rapidly filtered through medium grade filter paper, the process taking from 45–60 minutes. The filter papers were then inverted and thoroughly washed in distilled water, after which they were examined microscopically. The washings from the filter papers were centrifuged, and from the deposit so obtained films were made. These were examined both stained and unstained. In every case the result was negative, although in each case 25–40 films were examined. No larvae were found in any of the films.

On the day following “the bleeding,” the calf was killed. The skin was removed with care and films were made from the various parts of the subcutaneous tissues. Films were also made from the superficial blood vessels. Thorough examination for the presence of nodules, both superficially and in the deeper tissues, was not rewarded with a “find.” The search for unencapsuled worms, adult or larvae, proved equally fruitless.

The joints, the tissues around, the bursal fluid, and pieces of subcutaneous and muscular tissues were all thoroughly examined, but the result in each case was a negative one.

A special study of the lymphatic glands was made and proved equally unproductive.

The author gives a summary of all the chief positive observations which have, so far, been recorded in regard to the life-history and development of worm nodules in cattle.

R. P. C.

LECOMTE (A.). **Les Kystes à Filaires (*Onchocerca volvulus*) au Soudan Français.**—*Bull. Soc. Path. Exot.* 1915. Nov. Vol. 8. No. 9. pp. 655–656.

Lecomte considers that the area given for the geographical distribution of *Onchocerca volvulus* should be extended to include the French Soudan. In support of this opinion he records here two cases of *Filaria volvulus* infection, which he had under observation at the Native Hospital at Dakar. Both cases came from the Upper Senegal and Niger Territory, and until 1914, when they had been sent down to Dakar, had never left that district.

The cysts, in these cases, were located in regions which are poorly supplied with lymphatics, and were slightly painful. One was extirpated from a position below and external to the left anterior-superior iliac spine; the other from the right sub-spinous fossa. In the latter case the cyst was adherent to the aponeurosis of the subspinatus muscle. In one of the cases a small tumour, which had the appearance of a calcified cyst, was noted in the ninth intercostal space on the right side. Neither case showed any other symptom of filariasis, but in each inguino-crural polyadenitis was present.

R. P. C.

ROSENBERGER (Randle C.). **Filariasis associated with Schistosomiasis.**—*New York Med. Jl.* 1915. Oct. 30. Vol. 102. No. 18. Whole No. 1926. pp. 883–884.

The patient, a male aged thirty-one years, in whom the association of these two parasites was noticed, was born in Egypt and, according to the history of the case, had acquired both infections whilst resident there. Hematuria was first observed by the patient at the age of seven or eight, and he was then diagnosed to be suffering from bilharziasis. The passage of blood in the urine continued until he was twenty-one years of age, when it ceased spontaneously.

Chyluria appeared when aged twelve, and this continued for five weeks. No other symptoms of filariasis have at any time been noticed. When seen in July 1915 he had been absent from Egypt for thirteen years. He then complained that both symptoms had recurred and had been present for the past ten weeks.

Microscopical examination of the urine confirmed the presence of terminal-spined ova, and of microfilariae which possessed the morphological characteristics of the embryos of *F. bancrofti*.

Filarial embryos were also found in the peripheral blood, but no strict periodicity was noted.

A differential leucocyte count showed the presence of eosinophilia to the extent of 15 per cent. Presuming that salvarsan might be of service, an injection of this drug was given. The patient reported, two weeks later, that he felt a great deal better and that the urine was "entirely normal" again. Professor Rosenberger was, however, unable to obtain another specimen of urine, and could not confirm either the presence or absence of the ova and microfilariae after the treatment.

R. P. C.



LEIPER (R. T.). **Notes of the Occurrence of Parasites presumably Rare in Man.**—*Jl. R. Army Med. Corps.* 1915. June. Vol. 24. No. 6. pp. 569–575. With 8 figs.

The author states that the parasitic worms are generally so large and obvious that it would seem unlikely that forms other than unnatural infections could have remained practically unrecognised, but from material that had reached him during the last two or three years this is evidently the case.

*Physaloptera mordens* Leiper.—This parasite was first described from Uganda. Further examples have been obtained from negroes in the Transvaal and others from Portuguese East Africa.

“These worms live in the stomach, often in association with *Ascaris lumbricoides*, which they closely resemble. They are readily recognised with a hand lens, for they possess a cuff-like cuticular expansion at the anterior end which almost invariably obscures the lips. When these are visible only two are found, a feature which at once distinguishes the genus *Physaloptera* from the genus *Ascaris*. Moreover, the skin over the whole body is smooth, while in *Ascaris* it is characteristically transversely striated. . . . The eggs have a shell of thick clear cuticle with a smooth surface. The life-history is unknown, but presumably similar to that of the Ascaridae.”

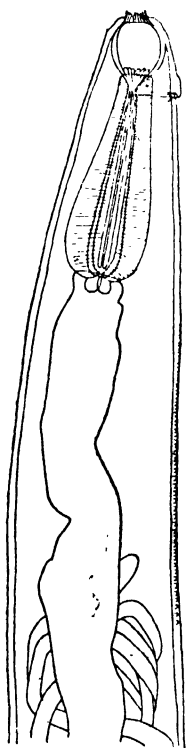


Fig. 1.

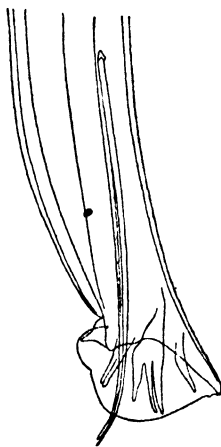


Fig. 2.



Fig. 3.

*Triodontophorus deminutus*.

- Fig. 1. Anterior end.  
Fig. 2. Posterior end of male, lateral view.  
Fig. 3. Posterior end of male, dorsal view.

*Triodontophorus deminutus* Railliet and Henry.—The author published an account of this species from a case in Nyasaland in 1908. Later, further cases were recorded from Nyasaland and from Portuguese East Africa.

"The parasites are apt to be mistaken for ankylostomes. They often occur in the same cases, and their eggs also are very similar. *Triodontophorus* has, however, a different habitat from the *Ankylostoma*. The former lives attached to the wall of the great intestine, the latter occurs only in the small intestine. Structurally the two parasites differ very considerably. The oral capsule in both has a chitinous wall, but in *Triodontophorus* the orifice is quite terminal, and is guarded by a ring of stout bristles. In *Ankylostoma* the mouth capsule is always bent dorsally, and the mouth capsule is guarded by bilaterally placed paired teeth."

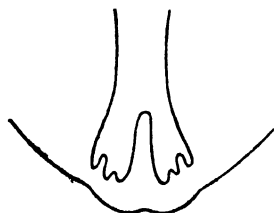


Fig. 4.



Fig. 5.



Fig. 6.

Fig. 4. Dorsal ray of *A. caninum*.

Fig. 5. Dorsal ray of *A. ceylanicum* ♀, from Sierra Leone.

Fig. 6. Dorsal ray of *A. ceylanicum*, from India.

*Ancylostoma ceylanicum* Looss.—This worm was detected as a common parasite of cats and dogs and an occasional parasite of man by Major Clayton LANE [this *Bulletin*, Vol. 2, p. 188]. In 1914 the author was unable to find this species in dogs in Shanghai and Hankow. Recently Dr. KERR has informed him that he has found what appeared to be *A. ceylanicum* in 10 to 12 per cent. of the cases examined by him in the prison at Chiengmai, Siam, usually with one or two worms in each case. Col. Leiper writes that worms from two of these cases were received and are undoubtedly examples of this species. The author refers to a paper by YORKE and BLACKLOCK on Ankylostomiasis in dogs in Sierra Leone. These authors say that they found *A. ceylanicum* and point out the importance of ascertaining whether it occurs in man there. The details given lead Leiper to doubt the accuracy of the diagnosis. He gives figures in support of this view and is inclined to think that YORKE and BLACKLOCK were dealing with *Uncinaria stenocephala* Railliet, a similar ankylostome often found in association with *A. caninum*.

*Euparyphium malayanum* Leiper.—This species was described in 1912 from material obtained in the Malay States, and later more fully by Professor ODHNER. Dr. KERR has now sent a single specimen from a case in Chiengmai. Major Clayton LANE has lately described a specimen from Assam under the name of "*Artyfechinostomum sufarthyfex*." Leiper writes that though the new species is placed in a different genus and subfamily of the Echinostomidae the great similarity in the descriptions and figures leaves room for doubt whether the species reported on by LANE is not the same as that previously described by ODHNER and himself [see this *Bulletin*, Vol. 6, p. 300].

*Opisthorchis viverrini* Poirier 1886.—In Dr. KERR's consignment of parasites obtained from prisoners at Chiengmai was a tube containing three flukes. It was stated that the ova were found in about 15 per cent. of faeces examined and the worms twice obtained post mortem. They were recorded as *Opisthorchis felineus*. Leiper says that they differ in that "the skin is covered with minute acicular spinelets ;

the ovary is multilobulate; the branches of the gut proceed almost to the extreme posterior end of the body. The ovary and testes fill the last fourth of the body between the gut branches." These points are shown in a figure. Leiper makes the provisional diagnosis of *Opisthorchis viverrini*, a parasite found in the Indian civet cat, but not hitherto recorded in man. Infection is acquired by the consumption of uncooked or partially cooked fresh-water fish.

A. G. B.

KERR (W. F. J.). **Intestinal Parasites in Northern Siam.**—*Trans. Soc. Trop. Med. & Hyg.* 1916. Jan. Vol. 9. No. 3. pp. 82–89.

In order to determine "the relative frequency of infection with various intestinal parasites among the prisoners in the Chiengmai jail," the author undertook an investigation which involved the examination and treatment of 230 male adult prisoners. The routine followed, in every case, was to make a microscopical examination of the faeces, and later to administer an anthelmintic. The following table gives the main results, as far as the helminths are concerned, in percentages:—

Parasite.	Primary exam. positive.	Parasites found after anthelmintic.	Parasites found after anthelmintic when primary exam. negative.	Total Infected.
<i>Taenia saginata</i> .. ..	30.0	56.1	28.3	58.3
<i>Opisthorchis felineus</i> ..	17.0	0.0	0.0	17.0
<i>Strongyloides stercoralis</i> ..	18.3	0.0	0.0	18.3
<i>Ascortis lumbricoides</i> ..	46.5	25.7	11.7	58.2
<i>Oxyuris vermicularis</i> ..	1.3	50.0	48.7	50.0
<i>Ankylostoma</i> sp. .. ..	(?)	14.8	(?)	14.8
<i>Necator americanus</i> ..	56.5	88.7	37.8	94.3
<i>Trichocephalus trichiurus</i>	27.0	1.7	1.3	28.3

Multiple infections were usually met with and, in one case of the series, seven species were noted. In one single instance no parasites were found. No attempt was made, at the preliminary examination, to distinguish the ova of *Ankylostoma* from those of *Necator*, all hook-worm ova being put down as *Necator*. Of the ankylostome worms which were recovered the majority have proved to be *A. ceylanicum*, although *A. duodenale* was met with and recognised.

The author is of opinion "that *N. americanus* is the common hook-worm throughout Northern Siam, and is indigenous to the country, as it is to the neighbouring territories."

"The anthelmintics used were eucalyptus mixture and beta-naphthol, either alone or combined with santonin. Without the santonin neither were of much effect in expelling round worms." It was noted in the case of taeniasis that when beta-naphthol was given, the proglottides were expelled singly or in short chains, and that the head was rarely found. After eucalyptus mixture the proglottides came away in long chains and heads were frequently recovered.

R. P. C.

MOILLET (A. K.) & CARRENO (F.). **Intestinal Parasites of the Isthmus of Tehuantepec [Mexico].—***Amcr. Jl. Trop. Dis. & Prevent. Med.* 1916. Jan. Vol. 3. No. 7. pp. 411-415.

During the past six months the authors of the above report have been examining the faeces of "practically all the patients" who have been admitted to the hospitals under their charge, and have arrived at the conclusion that 20 per cent. of the population of the town of Minatitlán are suffering from the effects of *Necator* infection.

They describe the town of Minatitlán as being extremely unhygienic and insanitary—partly built on a swamp and wholly devoid of any arrangement for the disposal of sewage—the majority of the population as going about barefoot and being ignorant of the rudiments of the laws of health, and the death-rate as high, even for that part of the Tropics.

The results obtained from the 550 cases examined may be summarised as follows :—

*Hookworm* was found to be present in 431 cases.

*Tricocephalus* was nearly always associated with hookworm.

*Ascaris* was present in one-third of the hookworm cases.

*Strongyloides* (usually associated with hookworm) was found on 28 occasions.

*Oxyuris* was noted in only 12 cases of the series.

*Taenia* is recorded as being a rare parasite, in spite of the frequency of "measley" pork.

The authors conclude, as a result of their experience in the treatment of hookworm cases, that :—

1. "The most common subjective symptom is epigastric pain coming on at uncertain intervals." This was noted in 320 cases.

2. Surgical cases should be examined for this infection previous to operation, "since the disease is the commonest cause of the non-healing of wounds."

3. "Afternoon and evening fevers without chills are more often due to hookworm than to malaria, in this place (60 cases)."

4. "Hookworm is certainly more common amongst the barefooted population" than in the case of the shod, in the proportion of four to one.

Regarding therapeutic agents the authors found male fern to be inefficient in the treatment of this disease, and thymol "too dangerous, owing to the facilities for obtaining alcoholic drinks." They found that the chloroform, castor oil and eucalyptus mixture gave good results in all but very obstinate cases. They finally had recourse to a mixture containing oil of eucalyptus, oil of chenopodium, chloroform and castor oil, but the results obtained from this mode of treatment are not recorded.

R. P. C.

COCHRAN (Samuel). **Concentration of Helminth Ova from Faeces.—***China Med. Jl.* 1915. Nov. Vol. 29. No. 6. pp. 398-399.

This note describes a method of concentrating helminth ova from faeces, which has the advantage of being a rapid one. The technique is as follows :—

A portion of the faeces the size of a walnut, or smaller, is mixed with 30-50 cc. of water and strained through a sieve, 90 meshes to the inch.

The faeces and water are then centrifuged in successive portions, the supernatant fluid being poured off each time and more of the mixture added until all has been centrifuged. This will take three to five centrifugings. To the deposit obtained by this process a calcium chloride solution (42·5 gm. to 100 cc. water) is added, and the contents of the tube are well mixed and again centrifuged. This time the ova float on the top of the fluid and can be pipetted off in the top layer of about 1 cc. The fluid pipetted off is removed to another tube which is filled with water and given a final centrifuging, which throws the ova to the bottom of the tube. The deposit is then withdrawn by means of a fine pipette and transferred to a slide for examination.

Dr. Cochran states that 15–30 turns of the handle of an ordinary hand centrifuge is sufficient for each centrifuging, and that the whole process can be completed in less than ten minutes. This method has been used for several months at the Hope Hospital, Hwaiyuan, and has given most satisfactory results.

R. P. C.

SINTON (J. A.) & BAILY (J. D.). **Eosinophilia in Some Cases of Helminthiasis.**—*Indian Med. Gaz.* 1916. Feb. Vol. 51. No. 2. pp. 58–60.

The authors record in this paper the results of a series of differential leucocyte counts, made “on 101 cases, in whose stools the ova of worms had been found.” In each case 500 white cells were counted, and the degree of eosinophilia in the pure infections (those in which only one variety of parasite was found) may be summarised thus:—

Parasite.	Cases examined.	Min. Eosin. count.	Max. Eosin. count.	Ave. Eosin. count.
1. <i>F. medinensis</i> ..	7	7·2%	20·0%	14·6%
2. <i>A. duodenale</i> ..	17	6·0%	30·2%	17·7%
3. <i>A. lumbricoides</i> ..	37	1·2%	21·6%	7·3%
4. <i>T. trichiura</i> ..	13	6·0%	23·2%	14·2%
5. <i>O. vermicularis</i> ..	1	—	7·4%	—

In the counts made from those cases which had mixed infections, the highest degree of eosinophilia was noted when *A. duodenale* and *T. trichiura* were associated (34·4 per cent.).

[The seven cases of *F. medinensis* are placed in the list of “pure” infections, since the authors do not mention that they were associated, with other helminths, in the same host. It is obvious, however, that if they are correctly placed in the 101 cases in whose stools ova were found they are mixed infections, and should be removed from the list of “pure” parasites.]

R. P. C.

SHIRCORE (T. O.). **A Note on Some Helminthic Diseases with Special Reference to the Housefly as a Natural Carrier of the Ova.**—*Parasitology*. 1916. Jan. Vol. 8. No. 3. pp. 239–243.

In this note Dr. Shircore calls attention to the results of an enquiry which he has been conducting at Mombasa, with a view to testing

suspicions he had of the housefly, as a natural carrier of helminthic ova. The investigation was carried out in consequence of the fact that patients, admitted to the Native Hospital, "contracted, after varying intervals, bowel troubles, which were found to be due to intestinal parasites." In the hospital, at this time, were porters attached to the Expeditionary Force, Indian Troops and "African cases" and flies were attracted especially to Native Hospital Ward No 3 in which the sick porters and "African cases" were located.

Flies were consequently caught, killed, and after washing in ether and water, were "well mashed up." The larger fragments were carried up to the top of the fluid by the ether, and the underlying fluid was pipetted off and centrifuged. The deposit obtained in the centrifuge tubes was examined for ova. The results which he obtained from the examination of 275 flies, obtained from four areas, are as follows :—

Place.	Number of flies caught.	Number of flies infected.	<i>Asc. lumb.</i>	<i>Tricho. disp.</i>	<i>Ank. duod.</i>	<i>Taenia sag.</i>	<i>Schist. man.</i>	Remarks.
Native Hospital, Ward 3 ..	100	10	—	6	1	4	—	One fly was doubly infected.
Police Lines ..	100	11	—	5	2	4	1	One fly was doubly infected.
Native Hospital	50	6	1	4	1	—	—	—
Meat Market ..	25	2	—	1	1	—	—	—

The author considers that the small number of *Ascaris lumbricoides* ova found in the flies is doubtless due to their large size, "this being in agreement with the observations of GRAHAM-SMITH."

Dr. Shircore suggests that, in districts where it is difficult to obtain faecal material for examination, this method of examining the flies for ova would assist in determining the "prevalence of helminthiasis." "The incidence of Helminthiasis at Mombasa" is given in the subjoined list. One hundred cases at the hospital were examined, and eighty-three gave positive results. It is on these eighty-three cases that the results are based :—

<i>Ankylostoma duodenale</i>	..	..	..	46%.
<i>Ascaris lumbricoides</i> ..	..	..	..	44%.
<i>Trichocephalus dispar</i> ..	..	..	..	43%.
<i>Taenia saginata</i> ..	..	..	..	29%.
<i>Schistosomum mansoni</i>	..	..	..	5%.
<i>Oxyuris vermicularis</i> ..	..	..	..	2%.
<i>Strongyloides stercoralis</i>	..	..	..	3%.

[That the housefly may ingest helminthic ova is, of course, a well-established fact, but it is difficult to understand the part played by the housefly in the transmission of such parasites as *Taenia saginata* and *Schistosomum mansoni*—which need definite intermediate hosts—and *Ankylostomum duodenale*—which requires a suitable external medium. Regarding *Ascaris lumbricoides*, the size of the ovum appears to present difficulties which must make its transmission by the housefly extremely rare. Unless it can be demonstrated that the passage of the ova of *Trichocephalus dispar* through the intestinal canal of the housefly accelerates the formation of the embryo, the transmission of this helminth in this way must be regarded as far from common.]

R. P. C.

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## BERIBERI AND DEFICIENCY DISEASES.

WILCOX (William Henry). **Beri-beri, with Special Reference to Prophylaxis and Treatment.**—*Lancet*. 1916. Mar. 11. pp. 553-557.

In this very interesting paper the author establishes the fact that beriberi is present among the forces employed in the Eastern Mediterranean and Persia. It is well known that scurvy dogs the armies employed in a long war, but it is rare for beriberi to be recognised among European troops. Over 50 cases are recorded, 26 from the British troops in the Dardanelles and 11 from Mesopotamia. Out of the 26 Dardanelles cases 21 had suffered from some toxic factor previously, associated with jaundice, paratyphoid, purpura or diarrhoea; in the Mesopotamia cases this was less evident. Clinically the cases could all be classed as belonging to the wet variety and there were three deaths in the Dardanelles series. The post-mortem records are specially interesting as showing marked evidence of congestion of the mucous membranes of the stomach and whole gut, but especially of the duodenum. A deficiency in the vitamine content in the food was recognised as the chief etiological factor. A concise account of modern knowledge on the subject is given. Accepting the want of the necessary vitamins in the food provided as a cause, every endeavour was made to supply these at once in the treatment.

Very excellent details are described how yeast can be supplied in palatable forms for both acute and chronic cases and a list of other articles of food in relation to their vitamine value is given. Attention is drawn to the fact that the curative agents for scurvy are not the same as for beriberi and that the anti-scurvy vitamine is destroyed at a lower temperature than the anti-beriberi vitamine, the latter being removed at 130° C. but not at 100° C.

A dietary for preventing beriberi in campaigns should contain haricot beans, pea flour, porridge and, if beriberi is present, some preparation of yeast. It is very important that cases should be detected as early as possible and the author emphasises the usefulness of the "squatting test." In this a beriberi patient is unable to raise himself or, if he does so, it is by climbing up his knees with his hands, like a patient suffering from pseudo-hypertrophic paralysis.

P. W. Bassett-Smith.

WALCOTT (Allen M.). **Beriberi in the Amazon Basin.**—*Jl. Amer. Med. Assoc.* 1915. Dec. 18. Vol. 65. No. 25. pp. 2145-2147.

In this very interesting paper the author shows that true beriberi is common in the Amazon Valley and that it can be effectively got rid of by proper dietetic methods. In 1912 LOVEFACE [this *Bulletin*, Vol. 1, p. 484] stated that the disease affecting the Madeira-Mamore Railway Company's servants was neither true beriberi, nor due to a deficient diet. This view is still held by many locally. In the four years previous to 1912 there were in the Candelaria Hospital of the Railway Company 963 cases diagnosed as beriberi, cases always being present in the wards. When the author took charge of the hospital he found that the diet of both the first and second class patients consisted very



largely of tinned foods, polished rice and white flour. He immediately abolished the greater part of the tinned foods, giving in their place fresh fruits, beans, meat, fish, and milk. By the changes in the diet beriberi has been practically eradicated from the medical department of the Railway without any change in the other conditions. It is also less prevalent outside, as the knowledge of the method of prevention was spread. He quotes one rubber plantation, in which 40 per cent. of the labourers in 1913 suffered from beriberi; the owner hearing of the improvement made by the author at Candelaria consulted him and carried out his instructions, which resulted in the disappearance of beriberi from his plantation. The treatment of beriberi at Candelaria consist in giving :—

- (1) Soups of beans and peas, fresh vegetables, fish and eggs.
- (2) Meat, all varieties served underdone.
- (3) Eggs, usually six daily. Fresh cows' milk several times daily.
- (4) Fresh potatoes, beans, peas, and other fresh vegetables and fruits.
- (5) Rice bran twice a day.
- (6) Strychnin 1/30 gr. every six hours.

He states that by the change many thousands of dollars yearly are saved in avoidance of invaliding and in increased security of life, causing the employees to remain longer at the contract stations at a more reasonable wage, with a decrease in death-rate and an increased daily working power. Among the natives who consume manioc largely, beriberi is common and some experiments carried out on fowls showed that an exclusive diet of this flour will produce in birds similar symptoms to those seen in the polyneuritis brought on by a diet of polished rice.

P. W. B.S.

**WILLIAMS (Robert R.) & JOHNSTON (John A.).** *Miscellaneous Notes and Comments on Beriberi.*—*Philippine Jl. Sci.* Sec. B. Trop. Med. 1915. Sept. Vol. 10. No. 5. pp. 337-343.

It is generally believed that cases of beriberi are most frequent, other things being equal, amongst those upon whose metabolic processes there is the greatest demand, as in pregnancy in woman, firemen in ships, and others employed on hard labour. Experiments were carried out with 24 fowls on various diets and exercises, and showed that high temperature and work hasten the onset of polyneuritis.

The authors do not believe in the deficiency of vitamins per se as the cause of beriberi, but rather that "in beriberi there exists a toxic substance which produces the symptoms of the disease." When the toxic substance is in great quantity or is produced very rapidly, the results are like those of anaphylactic shock, resulting in acute beriberi; if produced slowly, we get chronic beriberi with progressive nerve lesions. This toxic substance may be derived possibly from an organism, but more probably is a product of disturbed metabolism, for which vitamins act as antidotes rather than foods. The demonstration of this toxic substance in fowls has not, however, been successful though the results encourage the authors to try further experiments.

P. W. B.S.

**DRAPER (A. P.). Beriberi early Diagnosed and readily Curtailed.**—*Jl. Trop. Med. & Hyg.* 1916. Apr. 15. Vol. 19. No. 8. p. 92.

Reference is made to a small outbreak of beriberi, which occurred on board a Norwegian bark that put into St. Helena having been five months out from Lamu near Zanzibar. Nine out of a ship's company of fourteen showed symptoms of beriberi. Three were severe enough to require hospital treatment, the captain being one. They all improved very rapidly and were able to rejoin the ship in a week, but as they sailed three days after there is no information as to whether the cures were permanent or not. No definite information is given with regard to dietary or hygiene of the ship except it is stated that rice was sparingly used and that the forecabin was overcrowded and dirty.

P. W. B-S.

**McWALTER (J. C.). Relapsing Beriberi.**—*Brit. Med. Jl.* (Memoranda). 1916. Feb. 5. p. 201.

This is a record of a soldier patient aged 28, who contracted beriberi in India (exact locality not stated) while receiving the regulation army diet. The disease was of the mixed type and was associated with some cardiac dilatation. It is stated that he was liable to relapses of the condition whenever he became debilitated from any cause. In the remissions all the symptoms cleared up except the cardiac dilatation.

P. W. B-S.

**ROMMEL (G. W.) & VEDDER (E. B.). Beriberi and Cottonseed Poisoning in Pigs. (Preliminary Note.)**—*Jl. Agric. Res.* 1915. Dec. 13. Vol. 5. No. 11. pp. 489-493.

Meal made from cotton seed in America is used largely as a food for pigs, but only a part of this cotton seed meal is utilised owing to the sickness and mortality it produces if given too freely. Cattle fed on this substance may become lame and their eyes will suffer, but with pigs the ill effects are most evident. Two forms of disease are found in these, acute and chronic. In the former the attack is sudden, the animal has intense pain with shortness of breath, and death may follow very rapidly; dropsical conditions are frequently present. In the chronic form diarrhoea, emaciation and paralysis are present but the animal may live for a year or more. After death, congestions, effusions, and enlargement of the heart are found. These conditions are very similar to those known to follow the faulty metabolism from a diet deficient in vitamins, and recognised chiefly in man under the term of beriberi, a disease which has been reported by BRADDON to have been produced in a pig by feeding on polished rice. The authors carried out feeding experiments on twelve pigs, from which they draw the following conclusions:—(1) Pigs are susceptible to beriberi when fed on a vitamin deficient food such as rice, and it develops more rapidly in these than in man. In man it rarely appears before 90 days; in pigs pronounced symptoms may occur in 8-10 days. (2) It is believed that the so-called cotton seed poisoning of pigs is a deficiency disease analogous to, if not identical with beriberi in

man, the acute form corresponding to wet beriberi, the chronic to dry beriberi. (3) The cause of the cotton seed poisoning is probably a deficiency in the ration, causing among other manifestations changes in the nervous system.

Further experiments are being carried out to see if methods similar to those used for the prevention of beriberi in man can be practically applied to prevent cotton seed poisoning in pigs.

P. W. B.S.

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EDWARDS (C. R.). **Peripheral Neuritis in Jamaica.**—*Jl. of Trop. Med. & Hyg.* 1916. Mar. 1. Vol. 19. No. 5. pp. 53-54.

A chronic disease is prevalent in Jamaica affecting mostly the young adults of the poorer classes, particularly in the town districts. This has been variously described during the past forty years by Health Medical Officers as beriberi, a form of beriberi, or the results of malarial fever. The disease terminates fatally in some cases in about 12 years; treatment of the cases at their own homes is very unsuccessful, the patients finally becoming a burden on the State. Ataxic symptoms are marked and the absence of oedema and dyspnoea differentiates this disease from ordinary beriberi. Post-mortems of three cases showed marked emaciation with wasting of the muscles, but no definite changes in the internal organs. In the nervous system degenerated cells were found to the posterior and, to a less extent, in the lateral columns of the cord and in isolated patches in the cerebellum and at the roots of the auditory and optic nerves.

Improved dietary generally caused a decrease in the symptoms except in advanced conditions when the paralysis was complete, but relapses generally occurred when the patients returned to their homes. Though no definite opinion can be formed of the etiology of this disease the author believes that it has nothing to do with syphilis, tubercle, or malaria, that it originates in the nerve centres and nerve roots, and may probably prove to be a "food disease."

P. W. B.S.

WEILL (E.) & MOURIQUAND (G.). **Recherches sur les maladies alimentaires par "carence."**—*Bull. et Mém. Soc. Méd. des Hôpît. de Paris.* 1914. Aug. 6. 3 ser. Vol. 30. No. 28. pp. 276-284.

Since 1914 the authors, the former of whom is Professor for Diseases of Children at Lyons, have been carrying out research work on "deficiency diseases" or what they term "maladies par carence"—Barlow's disease, beriberi, polyneuritis avium, all depending upon a deficiency in food a portion of which is usually thrown away, this portion containing a minute quantity of a curative substance. The evidence of the presence of this in the covering of the grain is repeated and its vitamine character emphasised, but this is only bringing forward proof on proof of the accepted theory. In their experiments they quote an interesting series of pigeons fed upon pearl barley, which is much used for infants. These birds in three or four weeks developed motor troubles similar to those brought about by an exclusive diet of polished rice. They quote also a second series of pigeons fed upon coarse wheat flour; these birds showed no signs of any trouble by "carence" even after six weeks.

A microscopical examination showed that the flour employed was rich in cuticular fragments, which supplied the necessary substances. They state that there is clear proof that certain disease conditions of adults and infants are due to deficiency diets; that not only should the exclusive use of decorticated serials be avoided but other legumes should have their coverings intact as far as possible, and that when the flour of cereals or beans must be used, the nutritive value must be assisted by fresh vegetables, fruits and meat. The water in which rice, barley or wheat is boiled also contains much of the essential elements and should be utilised.

P. W. B.S.

WEILL (E.) & MOURIQUAND (G.). **Recherches sur la carence alimentaire à propos de la question du pain "de guerre."**—*Bull. et Mém. Soc. Méd. des Hôpît. de Paris.* 1915. Dec. 16. 3 ser. Vol. 31. Nos. 37-38. pp. 1145-1155.

The nutritive value of the various kinds of bread is at the present time of very great importance and the authors have followed up their previous papers on the diseases caused by a faulty dietary by a study on the different breads used under war conditions. It is well known that brown bread, which contains 74 per cent. of the grain as against 69-70 per cent. in white, is owing to its chemical composition the most nourishing, being richer in albumen, salts, etc., but the physiological experiments are still more conclusive, the decorticated grain, if given without a sufficiency of other foods, producing beriberi.

The same results follow whether the flour is obtained from wheat, rice, barley, or maize, and are always due to the removal of the outer coverings of the grain which contain a ferment, or the vitamine of FUNK. This ferment may be destroyed by heat in sterilisation even when the grain is not completely decorticated. The most nutritive bread would be that made from the whole grain, but the indigestibility of this would produce intestinal troubles rendering it generally unsuitable. Though perfect for a bird it is not so for man. Brown bread is easily digested and is both chemically and physiologically preferable for armies and large communities under the present conditions. The nutritive properties of bran, containing albumen, phosphates, and vitamines, might be more used in water or in the form of extracts in the bread.

The addition of flour from rice or other decorticated cereals, as recommended by MAUREL, is justified by appearance and caloric values but is not physiologically sound, the "ferment substance" which is indispensable for nutrition being deficient in all.

P. W. B.S.

WEILL (E.) & MOURIQUAND (G.). **L'Alimentation exclusive et la carence alimentaire.**—*C. R. Soc. Biol.* 1916. Jan. 22. Vol. 79. No. 2. pp. 37-39.

The authors point out that a varied diet will not always prevent the development of deficiency diseases, for a mixed diet of many cereals, deprived of their vitamine constituents, is as dangerous as, or even more so than, an exclusive diet of one of them. They also specially point out that sterilisation of otherwise safe foods destroys

these vital properties (Vitamines) of which infinitesimal quantities are required for the assimilation and utilisation of ordinary alimentary substances. They quote many animal experiments in support of these statements, most of which have been referred to in previous papers by these authors.

P. W. B-S.

- i. WEILL (E.), MOURIQUAND (G.) & MICHEL (P.). **Recherches sur la carence alimentaire. Effets comparés de la nourriture exclusive des chats par la viande crue, congelée, salée, cuite et stérilisée.**—*C. R. Soc. Biol.* 1916. Mar. Vol. 79. No. 5. pp. 189-193.
- ii. WEILL (E.), MOURIQUAND (G.). **Graines de céréales décortiquées, "hypercarencées" par la stérilisation.**—*Ibid.* pp. 194-199.

i. The authors fed cats on raw meat, frozen meat, recently salted meat, cooked meat, and meat recently sterilised or in which some time had elapsed since the sterilisation. One or two cats were used in each experiment. It was found that raw meat, frozen meat, and meat recently salted did not cause in any of the animals the nervous symptoms associated with deficiency. Meat recently sterilised caused the appearance of nervous symptoms on the 35th day in one case (death on the 39th), and on the 39th day in another (death on the 40th). Sterilised meat kept for 14 months caused nervous symptoms on the 25th day and death on the 30th; in other cases symptoms on the 35th and, in the case of a cat fed on sardines, on the 27th (death on the 30th). These nervous symptoms, consisting of paraplegia, convulsions or cerebellar disturbances, were very similar, if not identical with those caused in pigeons by the sterilisation or decortication of cereals. It appears as if sterilisation took from meat, just as it takes from grain, a "ferment substance" necessary for nutrition.

ii. The authors have shown that the decortication of cereals caused in pigeons, fed on them, paralysis of the beriberi type and death, and that the same results are produced by sterilisation of undecorticated cereals at 120° for one and a half hours. They thought it possible that in the case of the raw decorticated cereal the grain might contain small doses of vitamine sufficient to delay the appearance of symptoms. They therefore experimented with pigeons with raw decorticated cereal and with the same decorticated cereal sterilised by heat at 120°. The pigeons were artificially fed with exactly the same quantities of each description of grain. The result showed that the pigeons fed exclusively on raw decorticated barley had symptoms of deficiency on the 50th day and died, one on the 53rd and the other on the 60th day. Pigeons fed exclusively on the sterilised decorticated barley had symptoms of deficiency on the 38th and died on the 38th and 43rd day. Similar experiments were then made with raw and sterilised polished rice; the results were similar. That is to say, the "deficiency" is more complete in the sterilised than in the raw grain. They suggest that the results may be applied to flour made from such cereals and to man, prolonged cooking augmenting the danger of exclusive use of such flour.

A. G. B.

SEIDELL (Atherton). **Vitamines and Nutritional Diseases. A Stable Form of Vitamine, efficient in the Prevention and Cure of Certain Nutritional Deficiency Diseases.**—*U. S. Public Health Rep.* 1916. Feb. 18. Vol. 31. No. 7. pp. 364–370. With a chart.

The author notes that in all attempts which have so far been made to isolate vitamins in sufficient quantities for experimental studies, only very small yields have been obtained, owing apparently to destruction of the physiologically active substances during the various steps of the processes. Of the substances which have been shown to be rich in vitamins brewer's yeast is probably the cheapest; in most breweries the bottom yeast, remaining after each brew, is washed down the sewer. Filtered autolysed yeast was obtained by a method described.

"It [brewer's yeast] is first subjected to pressure in a hydraulic press for removal of the beer still retained by it. The press cake is then stirred with ice water and again pressed out. The cake is placed in enamel-ware vessels and brought to a temperature of 37.5° C. and held there for a period of about 48 hours. The autolysis is more or less complete at the end of this time and the material converted to the consistency of thick soup. After cooling to room temperature, the liquid is filtered through large folded filter papers."

It was found to contain about 23 per cent. of total solids. It will keep in a cool place for several months. When it was administered in 1 cc. doses on alternate days to a pigeon kept on a diet of polished rice, the pigeon did not lose weight or show symptoms within two months, whereas without the yeast filtrate it lost weight usually within the first five days and died within 20. The effective dose however for a man would be about 200 cc., so that it was necessary to concentrate it.

The procedures employed included vacuum distillation, evaporation in a current of dry air, and freezing and removing the ice by centrifugation. The concentrated liquid however became more and more syrupy and could not be converted to a solid. Alcohol was then tried, but vitamine was found both in the solid and in the filtrate. Attention was then turned to the absorptive quality of Fuller's earth for alkaloids, as shown by Professor John Uri LLOYD of Cincinnati. It was thought that this might remove the vitamine from the autolysed yeast filtrate. Such proved to be the case. In the first experiment a relatively large amount of "Lloyd's reagent" was used—200 gm. per litre of yeast filtrate. The mixture was thoroughly shaken and filtered and the solid residue was dried.

"The feeding experiments were conducted on a group of 12 pigeons. They were kept in a large cage and given as much polished rice as they would eat. They were weighed and dosed as follows at intervals of two to three days: Two of the pigeons were given 3 cc. doses of the original yeast filtrate (Y. F.), three received doses of 0.6 gram of the activated solid (A. S.) corresponding to 3 cc. of Y. F., three received 3 cc. doses of the filtrate from the activated solid (F.A.S.), and four were retained as controls.

"The results are plotted on the accompanying chart. It will be seen that the pigeons receiving the autolyzed yeast filtrate and the solid activated by being shaken with the yeast filtrate, not only showed no ill effects from the exclusive diet of polished rice, but actually gained considerably in weight. The controls and those receiving the filtrate from the activated solid all developed the typical paralysis of polyneuritis within from 11 to 23 days. The experiment, therefore, proves conclusively that, using a ratio of 200 grams per liter, the absorptive agent removes the vitamine promptly and completely from autolyzed yeast filtrate."

The author then proceeded to ascertain how small a proportion of the solid reagent would absorb the vitamine completely. This quantity was found to be 50 gm. per litre.

"On the basis of the above-described experiments the procedure which has been adopted for preparing activated solid from autolyzed yeast liquor is as follows: To a large volume of clear autolyzed yeast filtrate is added 50 grams per liter of the colloidal hydrous aluminium silicate reagent as prepared by Professor Lloyd, of Cincinnati for alkaloidal separations. The mixture is well shaken and allowed to stand several hours until the supernatant liquid is practically free of suspended solid. The dark liquid is then siphoned off and about an equal volume of water and enough standard hydrochloric acid is added to yield an approximately N/100 acid solution. The addition of this small amount of acid is necessary to hasten subsidence of the solid. After shaking and allowing to stand the supernatant liquid is again siphoned off. The solid is washed a second time with the very dilute acid and then poured upon a large Buchner funnel and washed several times with small portions of water and finally with about three small portions of 95 per cent. alcohol. The solid is then spread out on paper to permit the evaporation of the major part of the alcohol and finally dried to constant weight in vacuum desiccators containing concentrated sulphuric acid."

Both preventive and curative experiments on pigeons have been made and the results agree with those already given; 0.05 gm. of the activated solid on alternate days is sufficient to keep the pigeon in normal health and weight on an exclusive diet of polished rice and will cure paralysed pigeons. The comparative dose for a man would be 10 gm. of the solid on alternate days, which could be conveniently taken either in capsule or as an aqueous suspension. The author expects it to prove effective in beriberi. If it is not effective in pellagra, the concentration method could be applied equally well to some other raw product.

A. G. B.

## MISCELLANEOUS.

**KINGSTON, JAMAICA. Ninth Six-Monthly Report of the Government Bacteriologist. March-September 1915.** [SCOTT (H. H.). Government Bacteriologist.] M.S. Report received in Colonial Office.

This is a long Report forwarded for transmission to the Tropical Diseases Research Committee. The matter is considered under the headings Routine Work and Research Work.

*Routine Work.*—

Details of this are given in a table. Of 5,291 examinations 1,957 were of faeces for ankylostomes, 1,040 of rats for plague, 598 of blood smears, and 569 were Widal's reaction for enteric.

*Widal's Reaction.*—Of the 569 sera subjected to this test 183 gave positive results; 166 agglutinated *B. typhosus* only; 4 *paratyphosus A*; 2 *paratyphosus B*; while 10 showed a double infection with *B. typhosus* and *paratyphosus A*. Enteric fever prevails most extensively in Kingston. The reasons for this have been detailed in a paper already published by the author [this *Bulletin*, Vol. 7, p. 36], where it is shown that there are considerable numbers of unrecognised carriers and deficient methods of conservancy with a good water supply.

*Blood smears.*—Of 481 sent for examination for malarial parasites these were found in 90 instances: *P. falciparum* was present in 72, the parasites of benign tertian and quartan 12 times each. Microfilariae were never seen.

*Examination of faeces for ova.*—Tables are given on this subject. The numbers correspond very closely with those noted for the previous six months. "In other words, in spite of the thymolization which is carried on, the infection (particularly important with regard to ankylostomiasis) is not being checked and, in fact, is not even remaining stationary, but tends to increase." The type of helminth infection has a peculiar distribution. Thus at Annotto Bay ankylostomes alone were present in 82 per cent., but at Linstead only 13 per cent., whereas ascaris was found in less than 7 per cent. at Annotto Bay and 45 per cent. at Linstead.

Attention is drawn to the frequency of tuberculosis of the lungs. In 66 specimens out of 154 sent up *Bacillus tuberculosis* was found. The case is given in detail of a private of the West India Regiment who was admitted to hospital for haemoptysis with a temperature of 104·8°. The following day friction sounds were audible over the chest and there was considerable respiratory distress. Amoeba-like bodies having been seen in the expectoration emetin was administered; eventually the patient was discharged well.

"Repeated examinations for bronchomycosis, spirochaetes, paragonimus, and tubercle bacilli were negative; the amoeba-like bodies were the only organisms which appeared to have anything to do with the causation of the illness. They disappeared with the administration of emetine, reappeared temporarily with return of the symptoms on withholding the drug, and disappeared again on its readministration."

\* An account is given of some autopsies of special interest. Of the 1,040 rats examined for plague none was found infected.



*Research Work.—*

*The So-Called Vomiting Sickness of Jamaica.*—The account given of Dr. SCOTT'S investigations covers reports which have been noticed in this *Bulletin* [Vol. 6, pp. 426-7]. There is added the report of a recent case of poisoning by the fruit of the ackee, with details of the autopsy. The author's summary is given in full :—

"1. The term 'Vomiting Sickness' has been used for many years as a comprehensive name for various diseases, including cerebro-spinal meningitis, gastritis, gastro-enteritis, worms, malaria; in fact, practically any disease occurring in the cooler months and associated with vomiting and convulsions.

"2. During the last ten years opinions have been expressed to the effect that there is an affection called vomiting sickness whose course of symptoms and post-mortem changes are not those of any known disease.

"3. The death-rate from this affection is exceedingly high, 80 per cent. to 90 per cent., and a fatal termination occurs in a few hours.

"4. The first systematic investigation into the affection was undertaken by Captain (now Major) T. J. Potter, R.A.M.C., who came to the conclusion 'that the majority of deaths ascribed to the so-called vomiting sickness are due to yellow fever' (1911).

"5. To this succeeded the 'meningitis era,' a recrudescence of the older idea that some cases at all events included under the term 'vomiting sickness' died from cerebro-spinal meningitis.

"6. Seidelin's investigation took place the following year (1913) but, though he was the first to give a detailed description of the morbid anatomy he did not succeed in solving the question of causation. He showed, however, that there was a definite unexplained condition comprising the majority of cases reported as vomiting sickness and that the condition was neither yellow fever nor cerebro-spinal meningitis.

"7. Investigations into a typical and severe outbreak at Montego Bay in February 1915 revealed the fact that in a majority of the cases in which a reliable history was obtainable ackees formed part of the last meal taken in health, and that this article of food could not be excluded in a single case.

"8. Persons taking the 'soup' or 'pot-water' made with ackees in certain conditions showed the most acute symptoms; the onset occurred in two hours and death nearly always resulted.

"9. 'Salt-fish,' a frequent article of diet, is in the country parts used as a euphemism for 'salt and ackee.'

"10. Ackees under certain conditions are undoubtedly poisonous; among such conditions are: (i) Unopened ackees; (ii) ackees picked from a decayed, bruised, or broken branch; (iii) ackees which have not opened naturally, but which have been forced open; (iv) ackees with a soft spot in an otherwise apparently sound fruit.

"11. Much of the poison is extracted by boiling with water.

"12. The symptoms of a case of typical vomiting sickness are: Initial vomiting (gastric in origin) coming on in apparently perfect health; a period of a few hours improvement, succeeded by secondary vomiting (cerebral) rapidly followed by convulsions, coma and death. The average total duration of illness is 12½ hours.

"13. Initial, or secondary vomiting, or convulsions, may be absent, but not in a large percentage.

"14. Recovery, so far as I am aware, has never occurred when once convulsions set in, or coma; and, as a corollary to this, in no case which recover are convulsions seen.

"15. The affection is largely one of childhood, and shows no predilection for sex

"16. A reasonable interpretation of the symptom is: Some poison is taken, or some substance which acts as a poison after it enters the stomach. If the initial vomiting is sufficient to get rid of this substance no further symptoms occur, and recovery rapidly ensues. If this is not the case, there is an interval—a more or less quiescent period of absorption—after which there follow symptoms due to the action of the poison on the higher centres—secondary (cerebral) vomiting, convulsions, drowsiness, coma, and death.

"17. In rare instances the cerebral symptoms are those first noticed (convulsions, drowsiness, coma); there is no preceding vomiting—the so-called 'vomiting sickness without vomiting.'

"18. The pathological changes consist chiefly of general hyperaemia and a tendency to haemorrhages in various organs, fatty metamorphosis especially in liver and kidneys, and necrobiotic changes of epithelia in liver, kidneys, and pancreas.

"19. Micro-organisms are rarely found in true vomiting sickness cases, and, when present, are probably accidental and have no pathological significance.

"20. Intragastric administration of an extract made by boiling unopened ackees with water produced in three kittens and one pup the symptoms and pathological changes seen in cases of vomiting sickness.

"21. A case of ackee poisoning in a human subject exhibited the same symptoms, course, and post-mortem changes, macroscopical and microscopical, as (a) human vomiting sickness cases, and (b) animals to whom an aqueous extract of unopened ackees had been administered.

"22. The characteristics of vomiting sickness, viz.:—i. Peculiar seasonal prevalence; ii. Its confinement to Jamaica, so far as is known; iii. The sudden onset of symptoms in apparent good health, and in the well-nourished as in the emaciated; iv. The rapid and complete recovery of non-fatal cases; v. The affection of several members in one house or close neighbours in a settlement; vi. The vastly greater preponderance in children; vii. The absence of preference as regards sex; viii. The rarity of occurrence in White children and in East Indians; ix. The pathological changes induced; All find explanation in the view that the condition is an acute intoxication by unopened or unwholesome ackees—the fruit of *Blighia sapida*."

It is stated that further experimental work will come within the domain of the chemist. Fifteen excellent photographs illustrate the pathological changes in ackee poisoning in a human subject, in the tissues of animals dying after experimental infection with ackee extract, and in "vomiting sickness" in human subjects.

*Pellagra*.—This investigation was carried out by Dr. CATTO, Assistant Bacteriologist. The object was the histological investigation of tissues taken from pellagrins postmortem, with special reference to the possible parasitic nature of the infection. The material was obtained from six female patients who died in the Kingston Lunatic Asylum. The technique is detailed, and an account is given of the changes found in the nerve cells, kidney, liver, heart, spleen, pancreas, and intestine. No specific bacteria of any kind were discovered in the specially stained sections of the internal organs. The author did not find any protozoa, but thinks that the hypothesis of an intracellular parasite cannot be dismissed lightly.

A. G. B.

**KHARTOUM.** Report upon the Research Work of the Wellcome Tropical Research Laboratories, Khartoum, 1915. [CHALMERS (Albert J.), Director.] M.S. Report received in Colonial Office December 27, 1915.

This Report, it is stated, covers the work performed during the year 1915 by the Bacteriological Section and such portions of the work of the Chemical and Entomological Sections as are thought to be of interest with regard to tropical medicine and hygiene. It is noted that the Bacteriological Section has been short-handed owing to the war, and that the routine work has more than doubled owing to changes in the British regiments stationed at Khartoum and to an epidemic of cerebro-spinal meningitis.

*Bacteriological Section.*

The work is classified under the following heads :—(1) Streptococcal Infections; (2) Puerperal Fever; (3) Amoebic Dysentery; (4) Skin Diseases; (5) Kala Azar; (6) Cholera; (7) Beriberi. There was also work published on the classification of Fuckel's Fungi Imperfecti as seen in tropical medicine.

*Streptococcal Infections.*—As the state of knowledge with regard to the species of BILLROTH's genus *Streptococcus* was found to be very confused a provisional diagnostic table was constructed. This is the table which appears on page 395, in which the Streptococci are divided into ten groups. It is stated that there is doubt as to the existence of Group 5, the Gasogenous or Mastitidis group, and also Group 6, the Non-fermenting group. In working with these organisms Holman's medium has been found of great service. "This laboratory has almost entirely given up the qualitative examination of the fermentative action of organisms in sugars as the quantitative examination has been found to be much more satisfactory not merely for streptococci but also for other bacteria." The papers published, or to be published, are by CHALMERS and HADDAD on a case of septicaemia in which *Streptococcus equinus* Andrewes and Horder 1906 was found in the blood; one by CHALMERS and ATIYAH in which *S. salivarius* Andrewes and Horder 1906 and *S. bovis* Chalmers and Atiyah 1915 were described as causes of puerperal fever; CHALMERS and MARSHALL have written an account of some pathogenic "Faecalis" streptococci found in the Sudan.

*Puerperal Fever.*—CHALMERS and MARSHALL have found this to be in the Anglo-Egyptian Sudan mostly a local uterine infection and not commonly a septicaemia. Two causal organisms are *S. salivarius* and *S. bovis* (= *S. bovinus* Broadhurst 1915). CHALMERS and MARSHALL have found cases in which the causal organism was *S. versatilis* Broadhurst 1915, a member of the "Faecalis" group, and another due to *S. faecalis* Andrewes and Horder 1906. The sources of infection in the Sudan appear to be principally from human, equine and bovine faeces, the two latter being largely used in Khartoum and Omdurman as an application called "Zibla" which is applied to roofs and walls. Cow dung is also used as a poultice by the natives.

CHALMERS and O'FARRELL described the treatment of two cases of "Faecalis" infection with heterologous and homologous vaccines.

*Amoebic Dysentery.*—CHALMERS and ARCHIBALD have studied methods by means of which they think it may be determined that a given patient is free from infection [this *Bulletin*, Vol. 6, p. 444]. They have also dealt with the subjects of cryptic or latent infections and amoebic carriers.

CHALMERS and PAPATHEODOROU have written on the administration of emetin during pregnancy and menstruation, showing that it can be given in these conditions without serious harm in a maximum daily dose not exceeding half a grain [*loc. cit.*, p. 445].

*Skin Diseases.*—CHALMERS and O'CONNER have investigated a small epidemic of Pyosis corletti, a bullous eruption, which broke out in the Welsh Regiment. They traced the cause to an organism called *Aurococcus mollis* Dyar 1895 and showed that the origin of the whole outbreak was a case of Nile boils affecting an officer, *A. mollis* being the causal organism of that condition in the Sudan [*loc. cit.*, p. 133].

They note that WATERFIELD has for the first time reported an epidemic of Pyosis mansonii in the Sudan. CHALMERS and MARSHALL have described a case of Tinea capitis tropicalis caused by *Trichophyton discoides* Sabouraud 1909 [*loc. cit.*, p. 134]. The eruption resembled that which might be produced for purposes of malingering. It is believed that the disease may occur in the delta of the Nile as well as in the Sudan. CHALMERS and MACDONALD found that this organism grew well on a donkey, but not on a bull or a monkey [p. 135].

CHALMERS and MACDONALD have found a variety of *T. violaceum* in Khartoum and have named it *T. violaceum* var. *khartoumense* [*loc. cit.*, vol. 7, p. 123]. The common favus of the Sudan has been found to be *Achorion schoenleinii*.

"The Ringworms known at present to exist in the Anglo-Egyptian Sudan are therefore :—

- A. *Those usually without exudation or inflammation.*
  - a. *Trichophyton currii* described in last year's report.
  - b. *Trichophyton violaceum* var. *khartoumense* mentioned above.
- B. *Those associated with exudation or inflammation or both.*
  - c. *Trichophyton discoides* mentioned above.
  - d. *Achorion schoenleinii*, which is very common in the Sudan and is the cause of Favic Alopecia or baldness."

CHALMERS and DREW have given a differential diagnosis of "Atrophoderma biotriptica" [*loc. cit.*, vol. 6, p. 139].

*Kala Azar*.—Captain ARCHIBALD has studied the epidemiology of this disease along the banks of the Blue Nile. It makes its appearance at the end of or after the rains and is comparatively rare in females. He believes that water is the medium of infection, which is via the alimentary tract.

*Cholera*.—The same observer investigated two cases of cholera in Omdurman, where the disease has not been recorded for a number of years.

*Beriberi*.—A curious disease clinically resembling beriberi has been noted by Captains STIRLING, O'CONNER and FARROW, R.A.M.C., as occurring amongst the British regiments stationed in Khartoum. CHALMERS and ARCHIBALD in 1913 met, post mortem, with some curious fungal bodies in the nerves, and in 1914 ARCHIBALD found similar bodies in prepared specimens. These findings raise the question whether there may not be more than one type of disease found under the clinical term beriberi [this *Bulletin*, Vol. 6, p. 428].

An outline is given of the classification by CHALMERS and ARCHIBALD of the Fungi Imperfecti; it is too long for reproduction.

Mr. MARSHALL, Senior Bacteriological Laboratory Assistant, has published an account of a method, suitable for the tropics, of preparing Buchanan's medium, found of great use in isolating the meningococcus from nasal swabs. Attention is directed to the work on *Spirochaeta bronchialis* Castellani 1907, begun by Dr. FANTHAM in Khartoum [this *Bulletin*, Vol. 6, p. 211]. A list of references is given to 16 papers published.

*Chemical Section*.—BEAM and FREAK have published a paper on "A Greatly Improved Haemin Test for Blood with Notes on Some Recently Proposed Methods." In hot countries like the Sudan blood stains alter more rapidly than in more temperate climates, so that the Teichmann test has been largely abandoned. The technique of the test is detailed. It was found equally applicable to "blood stains

fresh or old (12 years), stains partially removed by soap and water, or heated to 110°, or mixed with earth, or to old stains on rusty iron which had been exposed to strong sunlight and atmospheric conditions for several days."

*Entomological Section.*—Mr. Harold KING has written papers on the life-history of *Argas brumpti* Neumann and on locust destruction.

A. G. B.

BULLETIN OF THE ST. LOUIS UNIVERSITY. 1916. Jan. Vol. 11. No. 6. 41 pp.—The St. Louis University Expedition to British Honduras for the Study of Tropical Diseases.

This Report is submitted to the authorities of the St. Louis University School of Medicine by Dr. J. P. COONY, Ph.D., S.J., and Mr. A. M. SCHWITALLA, S.J. The leader of the expedition, Dr. E. N. TOBEY, who should have compiled the Report, was most unfortunately lost in a hurricane. With him also were lost a large number of case histories, blood specimens and photographs, so that the material for the Report is small. An account is given of the life and work of Dr. TOBEY, and a list of his publications. On a description of the origin of the undertaking, which was planned as a preliminary expedition for the purpose of studying methods of procedure, equipment, organisation and personnel, there follow extracts from the diary of the expedition. It left St. Louis on July 19th and reached Belize on the 25th. Dr. TOBEY left the rest of the party at Punta Gorda in order to visit the hospital of the United Fruit Company, Guatemala. On August 12th he re-embarked for the States and on the 14th the vessel encountered the West Indian hurricane in which it is believed that all on board lost their lives.

A summary of the observations of the expedition is given under the headings People, Country, Climate, Water Supply, Food Supply, Sewage Disposal, Soil, Habits of the People, Health Laws, Medical Supervision, Hospitals and, lastly, an account of the tropical diseases which occur. These are malaria, hookworm, tropical ulcer (which is believed to include a number of forms), and diseases of rarer occurrence such as blackwater, dengue, yellow fever, dysentery, sprue, leprosy, Bay sore (which is probably due to *L. tropica*), beriberi, climatic bubo, pinta, the usual intestinal parasites, and three pathological conditions of the skin of insect origin. These are due to the chigger flea, the screw worm, and the "beef worm" (*Dermatobia cyaniventris*). Three insect pests which cause much inconvenience are the sandfly, the "botlass" fly and the "doctor" fly; these have not been identified. Baracouta poisoning is common in the summer months.

The authors recommend the establishment of a biological station in British Honduras.

A. G. B.

BILLINGS (W. C.). The Exclusion of Tropical Diseases by Means of Immigration Inspections.—*Amer. J. Trop. Dis. & Prevent. Med.* 1915. Aug. Vol. 3, No. 2. pp. 74-83.

It is noted that bubonic plague, yellow fever, cholera and leprosy do not come into consideration, because they come under the regulations for "quarantinable" disease. These, with the exception of leprosy, are acute whereas the "immigration diseases" are chronic

or prone to chronicity. The methods of examination of aliens arriving at San Francisco are described; those afflicted with detectable tropical disease are practically always orientals.

In the last three years the following diseases have been detected :—  
“*Uncinariasis* (2,398), *Trichocephaliasis*, *Ascariasis*, *Schistosomiasis*, *Clonorchiosis*, *Strongyloidosis*, *Balantidic Dysentery*, infection of the intestinal tract by *Taenia nana*, *Taenia saginata*, *Taenia solium*, *Taenia bothriocephalus latus*, the *Fasciolopsis buski*, and the *Diplogonoporus grandis*; Malaria, Liver Abscess, Sprue, Beriberi, Elephantiasis, Leprosy, Tropical Dysentery.”  
A. G. B.

MITCHELL (D. A.). *Some Effects of Damp Heat*.—*Jl. State Med.* 1915. Sept. Vol. 23. No. 9. pp. 277-282.

As surgeon on H.M.S. “Alert,” the author had for two years the opportunity of studying the diseases to which naval men are subject in the damp heat of the Persian Gulf in the summer months. He has watched the same men in three other climates under almost identical conditions of living and dietary. These were the hot dry climate of the Shatt-el-Arab river at Basra in the summer months, the moderately hot and damp climate of Bombay and Colombo from September to February, and the almost ideal climate of the Naval Camp in the hills of Ceylon during the same months. The expression “damp heat” is used to represent roughly a dry bulb temperature between 90° and 100° F. and a wet bulb reading within 5° of this. In the dry heat of Basra there might be 30° difference between the dry and wet bulb readings, the former rising to between 105° and 115° F. The diseases that he discusses are boils, inflammation of the external auditory meatus and a pyrexial condition.

The most prevalent affection was that of boils. Diet could be excluded as a cause, as at Basra and the Naval Camp boils were rarely seen. There was hardly any constitutional disturbance. Healing was very obstinate. The only means of preventing the boils was change of climate. The effect of this was observed on three occasions, twice when the ship left the Gulf for Colombo, and once when she went up the river to Basra; in the dry heat of the latter healing took place quickly, at Colombo and Bombay less quickly, but more so than in the Gulf. The author suggests that the condition was “primarily due to some alteration in the blood dependent upon the damp heat.” Microscopical examination of the blood showed as a rule an appreciable degree of anaemia, but nothing else abnormal.

Inflammation of the external auditory meatus was presumably due to the same cause. In the dry heat of Basra very few of these cases occurred and the few taken there were easily cured.

The pyrexial disease was seen in five cases, two of which occurred at Basra and three in the Gulf.

“Briefly the condition was one of prolonged low pyrexia, giving rise, after ten to fourteen days, to a very severe anaemia, and about a week later to an increasingly rapid pulse. The onset was fairly sudden, the temperature rising to 102° or 103° F., with general malaise, and usually a few scattered râles in the chest. A sore throat was present in two cases. The temperature fell irregularly to normal during the first week, to rise again in a curve which reached normal in another seven days. The summit of this curve was lower than that of the first week, and the curve of the third week was still lower, until, during the fourth or fifth weeks, the temperature hovered irregularly within a degree and a half of normal.

"The anaemia, commencing after about ten days, progressively increased; but, apart from some general weakness, these patients felt absolutely well after the first week. The pulse began to rise about the fourth week, and in two cases increased until 140 beats per minute were frequently recorded."

The two cases which commenced in the dry heat continued for six weeks in the Persian Gulf, but were "practically cured in the run from Muscat to Colombo," occupying 10 days. Blood examination showed nothing beyond simple anaemia. The author thinks that this disease "would seem to be dependent upon heat, whether acting directly upon the thermo-genetic centre in the brain or through the blood stream."

Sunstroke was rarely seen. Seven cases of an early stage of beriberi were noted in the Gulf, where it is commonly known as "pelagic oedema." The author was struck by the comparatively large number of kidney cases which occurred in the hot weather in the Gulf. These comprised acute nephritis, pyelitis and tubercle.

He has come to the conclusion that "damp heat of itself frequently produces an alteration in the blood, visible only as anaemia, and this alteration is primarily responsible for the difficulties encountered in the treatment of other conditions." [Unfortunately no details are given of blood examinations.]

A. G. B.

**CADDY (Adrian).** *Life Insurance in India.*—*Trans. of the Life Assurance Med. Officers' Assoc. London for 1912 & 1913.* 1914. London. pp. 33-70.

This paper, which was read before the above-named Society in March 1912, contains information which is of general interest. The records on which the data are based have been kept since the year 1892, that is for 19 years. The author and his brother at Calcutta had, up to the end of 1910, revised the papers of other examiners in 5,179 cases and had examined personally 6,276 cases, making in all 11,455. Of these 3,365 were Europeans, 530 Eurasians and the remainder natives of India, chiefly men from Bengal. It is noted that the hill men are not an insuring class, and that the men of the plains probably vary less from one end of India to the other than do races in Europe.

After a discussion, with tables, of the heights and weights of the native races the author gives the causes of rejection amongst European and native races. The following table is of cases examined only, percentages loaded and declined being added together:—

Disease.	Europeans (1,799).	Bengalis (3,483).
Inferior physique .. ..	1.55 per cent.	5.36 per cent.
Obesity .. ..	2.11 ..	5.34 ..
Glycosuria .. ..	.61 ..	3.24 ..
Albuminuria .. ..	1.22 ..	1.98 ..
Consumption .. ..	.44 ..	.91 ..
Consumptive family history ..	1.38 ..	.77 ..
Bad family history .. ..	.5 ..	.63 ..
Syphilis .. ..	1.0 ..	.34 ..
Heart disease .. ..	1.05 ..	.89 ..
Sundry diseases .. ..	3.39 ..	4.96 ..
Elephantiasis .. ..	— ..	.22 ..
Alcoholism .. ..	.72 ..	.22 ..

Inferior physique or obesity means 20 per cent. under or over the mean weight for a particular height; it is suggested that probably malaria and dysentery in youth and occasional famine account for the inferior physique, and an excessive carbohydrate diet and insufficient exercise amongst the well-to-do for the obesity. The difference between the figures for glycosuria is striking; the author would appear to attribute it to the carbohydrate diet consumed by the natives. The figures for heart disease among natives are lower than among Europeans owing, it is said, to the rarity of rheumatic fever in India. After remarks on vaccination and hernia the author comes to his figures for hydrocele, giving tables from both his revisions and examinations. Among 3,483 Bengalis examined 178 or 5.10 per cent. suffered from hydrocele, and among 2,134 Europeans 16 or .74 per cent. Figures for other Indian races are too small to be of value. With regard to Eurasians the author thinks that, as the percentage of Asiatic blood increases, so does the percentage of hydrocele. There are inconclusive discussions on opium and Indian hemp consumption.

With regard to the question of acclimatisation in the tropics the author "with much diffidence" quotes his own experience:—

"1. We think that the European does not acclimatise in the tropics; meaning by this, he is unable to rear healthy, strong children in India, that he is unable to continue in the same state of health as he was in on arrival in the country.

"2. Quite apart from the effects of tropical diseases, we think that the European gets debilitated by residence in the tropics and at least every four or five years requires a change to a temperate climate. As regards Europeans, Calcutta is one of the most healthy cities in the East; the Europeans live in a well-drained part, and have every convenience of water supply and electric fans, malaria and dysentery are uncommon; and it frequently occurs for them to live periods of several years without any illness at all; yet in spite of this, Government and mercantile offices have to give their staffs regular leave home to get full work out of them.

"4. The children of Europeans, who have been sent home when four or five years old for their education (the customary age) are generally not so fine physically as their parents, owing to the debilitating influence on their constitutions of the tropical climate at an important growing period of their lives."

A. G. B.

- GALLI-VALERIO (B.). i. *Notes de parasitologie et de technique parasitologique*.—*Cent. f. Bakt.* 1. Abt. Orig. 1914. Aug. 29. Vol. 75. No. 1. pp. 46-53. With 5 text-figs.  
 ii. *Parasitologische Untersuchungen und parasitologische Technik*.—*Ibid.* 1915. Aug. 25. Vol. 76. No. 7. pp. 511-518.

These papers contain contributions to the geographical distribution of parasites, bacteriological and protozoal observations, observations on helminths and arthropods, besides notes on technique. Of the various subjects the following are of interest to readers of this *Bulletin*:—

An acid-fast bacterium was found in the preputial glands of a *Mus rattus* at Lausanne. It is described and figured. Attempts to cultivate it failed. It suggests *M. smegmatis* of man, but much more so *M. leprae*. The name of *M. smegmatis* var. *muris* is proposed.

It was found that the eggs of several helminths could be kept in faeces covered with a thin layer of water for a long time without



change of form—those of *A. lumbricoides* from 1897 to 1909, when the embryos were well preserved but immobile; those of *N. americanus* for 4½ years; those of *H. diminuta*, with embryo and alive, for 2½ months. A series of experiments to determine the time required to destroy eggs of *A. lumbricoides* and *T. trichiurus* in faecal matter showed that concentrated sulphuric acid alone was effective.

DOBERNECKER has examined the body fluid of some female *A. lumbricoides* with the spectroscope and found the bands typical of vertebrate blood. The author has examined a female worm of this species, which had a reddish appearance, and obtained a strong blue coloration of benzidine paper besides crystals of haemochromogen. This supports the view that *A. lumbricoides* is a blood-sucker.

It is well-known that *Lynnaeus truncatula* is the intermediate host of *Fasciola hepatica*. The author last summer noticed in a puddle that specimens of *Aulastoma gulo* attached themselves to *Lynnaeus* and sucked at the shell. He put two *A. gulo* in an aquarium with *L. truncatula*; in a very short time they disposed of five snails. It would perhaps be useful to distribute this leech in districts where distomiasis prevails.

A. G. B.

FRAGA (Clementino). *Relações pathologicas entre o figado e o baço; aspectos clinicos da pathologia hepato-esplenica nos climas quentes.* [The Pathological Relationships of the Liver and the Spleen; Clinical Aspects of their Pathology in Hot Climates.]—*Brazil Med.* 1915. Aug. 1. Vol. 29. No. 29. pp. 225-227; Aug. 8. No. 30. pp. 233-235.

A clinical lecture on the subject indicated by the title. The principal point insisted on is that the functional incompetence of the liver so often met with in tropical climates is chiefly due to the circulation through it of unhealthy blood coming from the spleen. The malarial liver is therefore secondary to a malarial spleen, and the same thing occurs with kala azar and other similar complaints. Enlargement of the liver without associated enlargement of the spleen is always to be put down to errors of diet, and not to such causes as malaria.

[Of course this view has often been expressed before.]

J. B. Nias.

RUEDIGER (E. H.). *The Occurrence of Bacillus coli communis in the Peripheral Blood of Man during Life.*—*Philippine Jl. Sci.* Sect. B. Trop. Med. 1915. Jan. Vol. 10. No. 1. pp. 25-29. With 3 charts.

The author notes how few cases of blood infection with *B. coli communis* during life have been reported. During routine bacteriological examination of blood at the Philippine General Hospital he has seen four such cases; two died and two recovered; all were Filipinos. Details are given with temperature charts. His conclusions are as follows:—

"1. Microorganisms corresponding in morphological and cultural characteristics to *Bacillus coli communis* may in certain cases be obtained from the peripheral blood of patients during life.

"2. Invasion of the blood stream by such organisms is not necessarily terminal infection, as is shown by the large percentage of recoveries therefrom.

"3. Such infection may be considered primary as is shown in case 3 here reported.

"4. As a peripheral infection like that of case 4 the bacillus may enter the blood stream through the infected uterus.

"5. The agglutination test shows that these organisms differ from one another."

A. G. B.

d'ANFREVILLE (L.). *Les hémorragies au Maroc.*—*Bull. Soc. Path. Exot.* 1915. Oct. Vol. 8. No. 8. pp. 595-596.

The author considers that the climate of Rabat on the west coast of Morocco has a "congesting tendency." Tubercular haemoptysis is more frequent there than in Europe, and also persons free from tuberculosis but with a "congestive disposition," or with some defect in the circulatory system, are subject to haemorrhages. At the hottest time of the year such persons produce blood-stained sputa and sometimes have true haemoptysis. Brief notes of nine cases in Europeans are added.

[These would have gained in value had the author given data of the European population, and some meteorological figures.]

A. G. B.

i. LOEWENTHAL (F.). *Klinische Erfahrungen über ein neues Darmadstringens "Eтелен."* [Clinical Experience with a New Intestinal Astringent "Eтелен."]—*München. Med. Woch.* 1915. Dec. 21. Vol. 62. No. 51. pp. 1748-1750.

ii. SEIFERT (Otto). *Ueber Eтелен.*—*Ibid.* pp. 1750-1752.

i. The author lays down that for the treatment of inflammatory intestinal diseases an astringent, if it is to be free from objection, must (1) not act as a caustic in any form; (2) develop its astringent action first in the intestine, sparing the stomach mucosa and not interfering with the appetite; (3) the action of the tannic acid must extend to the lower section of the gut. Such a substance was put on the market a year ago by the firm of Fr. Bayer & Co. It was at first called Trigallacetol and recently has been given the name of Eтелен. It is described as the triacetylolethylester of gallic acid and is therefore chemically nearly allied to tannigen. Experiments on animals have been made by DRESER, but the reference to these is not given. Eтелен is a white tasteless powder. It is sold in tablets, 15 half gram tablets to a tube; they are given in water, tea or milk.

The author has tried this remedy in hundreds of diarrhoea cases of every kind and especially of a specific character. Short notes are given of 37 cases which, it is said, have been taken without selection. The cases include dysentery, some of which are stated to be of Flexner or Y type, typhoid, paratyphoid, septicaemia, ulcerative colitis and bowel inflammation after cholera. The remedy is said to be extremely well borne.

The author's conclusions are to this effect:—Eтелен is an astringent which acts promptly in most inflammatory infections of the bowel with diarrhoea. It often succeeds when all other remedies have failed. The author has not had a case in which the appetite was disturbed or vomiting was produced. The remedy has failed only in some cases of severe inflammation of the colon with ulceration, grave cases of

septicaemia, and tuberculous diarrhoea; in these cases almost all other drugs have likewise failed. The best dosage is stated to be 6 to 8 gm. a day in severe cases and half that amount in slight ones. It is advised that the preparation be continued some days after diarrhoea has ceased. Finally, a combination of etelen with adrenalin is recommended.

ii. This author has used etelen in about 50 cases of acute catarrh of the bowel, mostly summer diarrhoea, in 30 cases of tuberculous diarrhoea and 25 of urticaria from food. He gives an equally favourable account and points out that in nearly all cases colic was quickly reduced. Two of the cases of urticaria are described in detail. In his conclusions he states that in tuberculous diarrhoea etelen acts better than any other bowel astringent and he suggests that it has an anti-septic action. He says also that etelen keeps well in the tropics and suggests that it should be introduced for acute and subacute forms of amoebic enteritis.

A. G. B.

JOHNSTON (Reginald). **Pituitrin, with Special Reference to its Action during Pregnancy and Labour on European Women resident in the Tropics.**—*Dublin J. Med. Sci.* 1915. Oct 1. 3rd Ser. No. 526. pp. 241-260.

This communication was a thesis submitted for the degree of Doctor of Medicine. The author gives a historical account of the discoveries in regard to the pituitary body; he describes its anatomy and development and gives a synopsis of the physiological work which has been done, and of the pathology and pharmacology. He uses pituitrin, the extract prepared by Parke, Davis and Co. In two instances in which the preparation of another well known firm was employed, the results were "somewhat startling." He gives an account of 16 cases, 9 primiparae, treated. He has come to the following conclusions:—

"1. The child must lie in the long axis of the uterus and present preferably by the head.

"2. There must be no pelvic contraction beyond a very slight amount, and no obstruction of any kind to labour. Rectum and bladder *must* be empty.

"3. The os must be soft and easily dilatable.

"4. The dose should be 1 cc., not more, except in cases of inertia of multiparae. It should not be given more frequently than once an hour, and never more than 5 ccs. to any one case.

"5. Injection into the buttocks is the best way of introducing the drug.

"6. The best time to get the full effect of the drug is at the end of the first stage and with the membranes ruptured.

"7. The drug has more effect at full term than at any other period of pregnancy.

"8. It is well to give a routine dose of 1 cc. to every case that fulfils the conditions necessary for the use of the drug because of the great help it is in causing the detachment of the placenta.

"9. The perineum must be especially guarded, as the pains caused by the pituitrin are of great expulsive force. Chloroform diminishes the intensity of the pains, and if pushed causes their disappearance.

"10. The milk-increasing power of pituitrin and its use as a peristaltic and diuretic, claimed by some authorities, do not seem to apply to Europeans in the tropics.

"11. Large doses frequently repeated seem to have a slight toxic effect on the mother and child.

"Where it has been possible I have instructed my patients to have a hot Sitz bath every evening for about a quarter of an hour for last three months of pregnancy, then to use pure olive oil as an inunction for the perineum and surroundings. I have removed all meat from their diet for the last four months. These details, with the usual care for general hygiene, seem to aid pituitrin in its effect."

A. G. B.

HINGSTON (C. A. F.). **The Uses of Pituitary Extract in Labour, at the Government Maternity Hospital, Madras.** [With a Note by Lt.-Col. G. G. GIFFARD.]—*Indian Med. Gaz.* 1916. Mar. Vol 51. No. 3. pp. 81-85.

During the last two years over 1,000 doses of pituitary extract have been given at the Government Maternity Hospital, Madras, to women in labour, cases of Caesarean section and to induce labour. The earliest time to give the extract to women in labour is when the cervix is "taken up." Chloroform inhalation or morphia injection should follow at once. There is no danger to mother or child when pituitary extract has been thus administered. The author considers the combination with chloroform to be the best method. He uses 1 cc. of Burroughs Wellcome & Co's pituitary extract (Infundin) and immediately thereafter gives chloroform till the patient has lost all reflexes. If the accoucheur is satisfied that the head will pass into the pelvic cavity without harm to the child, infundin may be given to drive the head into the cavity. The best place for injection is the upper arm. Chloroform is administered till labour is completed and, if the action of the infundin appears to be wearing off, a second injection should be given half an hour after and thereafter a third and even a fourth. Labour is nearly always completed two hours after the first injection. It is stated that the drug shortens labour by many hours. The membranes should be left entire as long as possible. If the infundin has not been given before the child is born it is advised to give it immediately after. In preventing post partum haemorrhage it seems to act in two ways—causing a slowing of the action of the heart as well as contraction of the uterine muscle. The 1,000 cases include face and breech presentations. As regards Caesarean section infundin was given in the author's eight cases a few minutes before the operation was begun. It is strongly recommended.

A note is added by Lt.-Col. G. G. GIFFARD, whom Major Hingston succeeded as professor of midwifery at the Medical College, Madras, also strongly advising the use of pituitrin in labour. He thinks that it may be brought into general use.

A. G. B.

CHALMERS (Albert J.) & HADDAD (George). *Streptococcus equinus* Septicaemia in the Anglo-Egyptian Sudan.—*Jl. Trop. Med. & Hyg.* 1915. Dec. 1. Vol. 18. No. 23. pp. 265-269.

A Sudanese who attended animals including a donkey injured his big toe, tearing off the nail. Later, when a gland in the groin had suppurated and burst he presented himself for treatment and was

admitted to hospital. On the sixth day his temperature rose suddenly and remained high till his death five days later with cellulitis in the groin and scrotum. His peripheral blood was cultured in broth and *S. equinus* Andrewes and Horder obtained. The morphological, biological, and cultural character of the Streptococcus are described. It produced a fatal septicaemia in rabbits when inoculated intravenously. The authors give their reasons for attributing this organism to the genus *Streptococcus* Billroth 1874 and go on to discuss the species giving a "provisional diagnostic table of [ten] streptococcal groups," nine of which are parasitic in animals. This species is to be placed in No. 7 group, the *Equinus* group [see below]. They discuss *S. equi* Schutz 1888, the cause of strangles in horses, and decide that this belongs to the next group, the *Erysipelatis* group. Their view is that the streptococcus which infected the man was acquired from equine faeces. *S. equinus* has not hitherto been regarded as pathogenic to man and this is the first time it has been seen in the Tropics.

A. G. B.

CHALMERS (Albert J.) & ATIYAH (Salim). **Streptococcal Puerperal Fever in the Anglo-Egyptian Sudan.**—*Jl. Trop. Med. & Hyg.* 1916. Jan. 1. Vol. 19. No. 1. pp. 1-13.

A long and interesting paper which cannot be summarised fully. The authors discuss tropical puerperal fever in general and point to the statistics furnished by one of them as to this disease in Ceylon. Whereas the annual deaths attributed to child birth among Europeans was 0.1 per cent., this figure was 1.2 for Sinhalese, 0.8 for Tamils, 1.1 for burghers, and 1.1 among the Mahommedan communities. BROOKE is quoted with approval as saying that "the mortality and morbidity from puerperal sepsis . . . among native communities are enormous." An account is given of the investigations into the aetiology of this disease from the earliest times, with a list of five known puerperal streptococci. Infection may be autogenetic or heterogenetic.

They obtained the strains of streptococci, here described, in pure culture from the intra-uterine discharges of six cases of puerperal fever occurring at Khartoum and Omdurman. The strains are divided into two series of three each, according as they ferment or do not ferment salicin. The strains of each series are then described, their morphological and cultural characters, biochemical reactions and pathogenicity. Cultures were in each case non-pathogenic to rabbits. For reasons given it is believed that all six strains belong to the genus *Streptococcus* Billroth 1874. Both series are to be placed in the *Salivarius* group, which is the bovine faecal type. The *Salivarius* group itself is defined.

To the salicin fermenting section is given the name *S. bovis*, the conclusion being that three of the strains belong to *S. salivarius* Andrewes and Horder 1906 and the other three to *S. bovis* Chalmers and Atiyah 1915, a description of which is given. They remark that it is difficult to prove the aetiological role of these streptococci and give their reasons for assuming it in these cases. Both species are found in human saliva and in cow's dung, and the question of the source of infection is discussed. They note that *S. salivarius* formed 64 per cent.

of the streptococci found in bovine faeces in America by FULLER and ARMSTRONG, and that cow's dung is used in the Sudan in at least three different ways—as a poultice and as washes or constituents of walls, roofs and floors. The diagnosis is discussed, malaria being the most important disease to bear in mind; it is considered that any fever attacking a puerperal woman in the tropics should be assumed to be puerperal fever till it is proved to be something else. Treatment and prevention also are gone into.

A. G. B.

CHALMERS (Albert J.) & MARSHALL (Alexander). **Pathogenic "Faecalis" Streptococci in the Anglo-Egyptian Sudan.**—*Jl. Trop. Med. & Hyg.* 1916. Mar. 1. Vol. 19. No. 5. pp. 54-62.

A third paper in this series. As the summary seems to contain all that is essential it is appended:—

"*Summary.*—Four cases of disease are described in which streptococci belonging to the *Faecalis* Group were found, and which belong to two distinct species, separated by the fermentation or non-fermentation of the trisaccharide raffinose, which must be a more difficult sugar to decompose than a mono-saccharide or disaccharide, and which therefore affords an important distinction.

"The two organisms are:—

"(1) *Streptococcus faecalis* Andrewes and Horder 1906, which we believe is now described for the first time as the causal agent in disease in the Tropics, being found in a case of septicaemia associated with endocarditis, and being also present in a traumatic pleural effusion, which may be illustrations of the peculiar way in which streptococci are attracted from their usual portals of entry to distant organs.

"(2) *Streptococcus versatilis* Broadhurst 1915, which has just recently been named, is now defined, for although its reactions have been noted by several workers in Europe and America, it had never been separated from *S. faecalis* or from the members of the *Salivarius* Group until Broadhurst's paper appeared in September of this year.

"This organism we found in a case of puerperal fever and in one of tonsillitis.

"The list of streptococci known to cause puerperal fever will therefore now include the following:—

"(1) *S. erysipelatos* Fehleisen 1883.

"(2) *S. foetidus* Veillon 1893.

"(3) *S. anaerobius* Lewkowicz 1901.

"(4) *S. mitior* Schottmüller 1903.

"(5) *S. salivarius* Andrewes and Horder 1906.

"(6) *S. puerperalis* Furneaux-Jordan and Mackay 1912.

"(7) *S. bovis* Chalmers and Atiyah 1915 (*S. bovinus* Broadhurst 1915).

"(8) *S. versatilis* Broadhurst 1915.

"We would also draw attention to the fact that streptococci may gain entrance to the circulation and may cause a subacute form of septicaemia and heart disease in the Tropics, as in temperate climates, though this happens much more rarely, as far as we know, in the former, which may be due to the influence of climate and especially of atmospheric temperature."

In all three papers the provisional diagnostic table of streptococcal groups is given, in the last slightly changed. It is here reproduced.

## PROVISIONAL DIAGNOSTIC TABLE OF STREPTOCOCCAL GROUPS.

<i>A. Parasitic on plants.</i> Grow in broth but not on agar or gelatine . . . . .		<i>I. Sphagni group.</i>
<i>B. Parasitic in animals.</i> Grow in broth and on agar and usually on gelatine :—		
<i>F. Obligatory anaerobes.</i> . . . . .		<i>II. Foetidus group.</i>
<i>G. Aerobes, facultative anaerobes :—</i>		
<i>M. Pigment present</i> . . . . .		<i>III. Sanguineus group.</i>
<i>N. Pigment absent :—</i>		
<i>R. Gelatine actively liquefied</i> . . . . .		<i>IV. Gracilis group.</i>
<i>S. Gelatine usually not or rarely slightly liquefied. Inulin usually not fermented :—</i>		
<i>1. Gas produced</i> . . . . .		<i>V. Mastitidis group.</i>
<i>II. Gas not produced :—</i>		
<i>Non-fermenters. (a) Glucose and other sugar media not fermented</i> . . . . .		<i>VI. S. H. &amp; S. (I) group.*</i>
<i>Monosaccharide fermenters. (b) Glucose usually and other sugars generally fermented :—</i>		
<i>Equine faecal type.</i> <i>1. Glucose alone or with saccharose and salicin, but not with lactose, fermented</i> . . . . .		<i>VII. Equinus group.</i>
<i>Disaccharide fermenters. 2. Lactose, glucose, saccharose and salicin, but not mannitol, fermented</i> . . . . .		<i>VIII. Erysipelatis group.</i>
<i>Human faecal type. 3. Lactose, glucose, saccharose, salicin, mannitol and sometimes raffinose fermented</i> . . . . .		<i>IX. Faecalis group.</i>
<i>Trisaccharide fermenters. 4. Raffinose, lactose, saccharose, usually glucose, sometimes salicin and rarely inulin, but not mannitol fermented</i> . . . . .		<i>X. Salicarius group.</i>
<i>Bovine faecal type.</i>		

A. G. B.

CHALMERS (Albert J.) & O'FARRELL. **A Note on Vaccine Treatment in Streptococcal Puerperal Fever.**—*Jl. Trop. Med. & Hyg.* 1916. Apr. 1. Vol. 19. No. 7. pp. 77-79. With 2 charts.

In the second of this series of papers it was shown that a number of cases of puerperal fever were caused by members of the Salivarius group of streptococci. In the third paper a case of puerperal fever caused by the Faecalis group was mentioned; the authors have since met with another case, which they treated with vaccine. They note that the Sudan cases of streptococcal puerperal fever are peculiarly suitable for vaccine therapy, being localised infections; so far they have been unable to find any evidence of septicaemia. An account is given of modern views as to the treatment of this disease by vaccines. The first of the authors' cases was in a multipara. She was said to have had an easy confinement; she kept well for seven days, when she

\*[The letters stand for STOWELL, HILLIARD, and SCHLESINGER, and the bracketed number indicates the first group of streptococci described by them in 1913. It is a doubtful separate group.]

received an intra-vaginal douche after which the fever began. An intra-uterine swab produced a pure growth of streptococci which proved to be *S. versatilis* Broadhurst, of the *Faecalis* group. She received a dose of anti-streptococic serum and the uterus was thoroughly cleansed. She then received 5,000,000 of the stock *Salivarius* vaccine without any apparent result. Six days later she received 5,000,000 of an autogenous vaccine. She became still worse till five days later when she received 200,000,000 of this vaccine, after which her temperature gradually came to normal. The temperature chart is given. The second case was a very severe type of fever which had lasted six days. The temperature was 104.6° and the pulse weak and extremely rapid. The uterus was douched out with antiseptics, but this had to be stopped owing to the patient's friends. She was treated with the vaccine made from the first case, a 5,000,000 dose, three days later 50,000,000 and, when the temperature rose again, on the 8th day after the first injection, 200,000,000; she made a good recovery.

The authors think that if vaccines are used the therapeutic dose should be sufficiently large; they believe that many failures are due to the use of too small doses. A. G. B.

GIVEN (D. H. C.). **The Campaign against Mosquitoes on Board H.M.S. "Cadmus."** *Jl. State Med.* 1916. Feb. Vol. 24. No. 2. pp. 47-51. With 2 figs.

This campaign took place at Hankow which, the author states, is considered to be one of the worst ports on the Yangtse for mosquitoes. The providing of scuttles and ports with fine wire gauze netting was useless and it was found that the ship's sampans were mainly responsible for them; after the cleansing out of the sampan bilges the diminution in numbers was very marked. However mosquitoes still continued to reach the ship, which was anchored 300 yards from the bank, and it is suggested that they were blown off from passing junks or sampans or from the shore. The problem was dealt with by the use of oil of citronella, mosquito nets and Japanese joss sticks. It is pointed out that it is difficult to fix netting round a hammock so as to make it mosquito proof, but two torpedo shaped nets (figured) have been devised. Oil of citronella proved very effective. The author obtained 10 lbs. of it, which lasted practically the whole of the summer. Half a drachm or less was sufficient to protect the feet, ankles, hands and face for at least four hours. The joss sticks were burnt, three or four at a time, under the table during dinner, with the result that few mosquitoes were seen in the ward room. The author says that there was not a single case of malaria during the ten months sojourn of the ship up the Yangtse, though a number of cases occurred on board other ships. [He does not indicate the species, or genus, of the mosquitoes.] He thinks that citronella should be supplied as part of the ship's stores.

A. G. B.

MONIZ (Gonçalo). **Destrução dos mosquitos adultos pelos vapores de creolina.** [The Destruction of Adult Mosquitoes by Vaporized Creolin.] *Brazil Med.* 1916. Feb. 5. Vol. 30. No. 6. pp. 41-43; Feb. 12. No. 7. pp. 51-53.

The author finds that cresyl or creolin, vaporized by means of a spirit lamp, is a very efficacious method of destroying mosquitoes in



closed rooms. By experiment, he fixes the quantity to be used at 6 cubic centimetres for every cubic metre of space in the room, or 600 cc. for a room containing 100 cubic metres of space, more or less. This quantity should be placed in a tinned iron vessel, standing upon a tripod of the same metal, in a basin of water upon the floor, and the precise quantity of alcohol required to vaporize this quantity of creolin is found by experiment to be 270 cc. Precisely this quantity of alcohol therefore should be put into a suitable metal lamp and burnt under the vaporizer, waste of alcohol thus being avoided, while it becomes unnecessary to enter the room in order to extinguish the lamp. The vapours of creolin are so heavy that it is not necessary to paste up all cracks in the walls and floor, it being sufficient to close the doors and windows. The room should remain closed for three hours, by which time all the mosquitoes and other insects in it will be found to be dead.

As compared with pyrethrum, as recommended by LIMA and others, this process has the advantage of much greater cheapness, even when taking the cost of alcohol into consideration, while there is no smoke to damage objects and the bleaching effect of sulphurous acid is avoided.

J. B. N.

LAVERAN (A.). **Présentation de moustiquaires destinées spécialement aux troupes en campagne et aux voyageurs.**—*Bull. Soc. Path. Exot.* 1916. Feb. Vol. 9. No. 2. pp. 75-78; Mar. No. 3. pp. 122-124. With 5 figs.

In this paper the author gives a description with photographs of mosquito nets suitable for soldiers who are campaigning in malarious countries. Four of the models illustrated are for the protection of the head. Two are French, one is the model in use in the American army, especially in Texas, and the fourth is the model used by the Japanese army. The fifth figure illustrates a net of bell shape, which is designed for use in bed and protects the head, shoulders and arms; it is said to weigh only 500 gms.

A. G. B.

ROSS (J. A. Park). **Mosquito Nets for Active Service.**—*S. African Med. Rec.* 1915. Dec. 11. Vol. 13. No. 23. pp. 347-348. With 2 figs.

The author describes two mosquito nets which he has devised and used. One consists of a patrol tent made in green celycal cloth (silk and cotton), each gable of which is fitted with two green mosquito net curtains. The arrangement is described. This holds two persons and weighs without pegs under 5 lbs. The other is a patrol net, the construction of which is shown in a diagram. It weighs less than 1½ lb.

A. G. B.

LEGENDRE (Jean). **Sur un nouveau mode de transport des larves de moustiques.**—*C. R. Soc. Biol.* 1916. Jan. 8. Vol. 79. No. 1. pp. 26-27.

The author finds that larvae of *Culex* can be kept without water in a closed box for some days if they are not allowed to dry up. This facilitates their transportation. Twenty larvae were placed between

layers of damp moss in December (presumably in France) and the box was hermetically sealed. Five days later they were turned out into water and all were living except some in the bottom layer which had probably become squeezed out of existence. He has had no opportunity of experimenting with *Anopheles*.

A. G. B.

d'ANFREVILLE (L.). **Les Moustiques de Salé, Maroc.**—*Bull. Soc. Path. Exot.* 1916 Mar. Vol. 9. No. 3. pp. 140-142. With 6 figs.

Notes on the mosquitoes of Morocco. The author did not begin his enquiries till October, when mosquitoes begin to get scarce. *Anopheles* become very rare in that month, but a few persist till January when the temperature goes down at night to 5° or 6°. The author gives an enumeration and description of the mosquitoes found between September and February. It includes *Stegomyia fasciata*, *Anopheles maculipennis*, *Culex annulatus* var. *maroccanus*, of which a detailed description is given, and *C. fatigans*.

A. G. B.

MALLEY (C. W.). **Note on the Use of Poisoned Bait for controlling the House-Fly, *Musca domestica*.**—*S. African Jl. Sci.* 1915. June. 8 pp.

As the author states, the question is how to deal with manure so as to prevent flies from breeding in it. He discusses the method of collection of all organic matter into a fly-proof manure repository, and concludes that the drawback is the initial expense and the fact that no relief is afforded in regard to flies that come from breeding places not under control. The advantage of the poisoned bait method is that the flies are destroyed as soon as they emerge from their breeding places and before they deposit their eggs. Arsenite of soda was found to be the best insecticide. The solution used consists of 1 lb. arsenite of soda and 10 lbs. of sugar in 10 gallons of water, the cheapest grade of sugar being employed. The bait is used on a "bait carrier" which can be kept out of the way of children and animals. Branches of certain trees meet this requisite, especially those that have firm foliage. They are exposed in "strategic situations," that is over manure heaps or other breeding places in or around buildings, over garbage receptacles, etc., the solution being distributed on the leaves by means of a garden syringe. Other substances serve well as bait carriers provided that the surface is hard and smooth, so that the bait remains easily available. The bait may be sprinkled over the manure itself, the surface of the straw serving as bait carrier. Instances are given in which this method was employed, the bait being used two or three times a week. It should be continued at least once a week during the colder months.

Recently the author has employed the method in military camps. He finds that tent canvas serves well and thinks that old bags or even strips of hessian soaked in bait would render good service. Even bait sprinkled on the ground is not wasted. Finally, he says that this method works out much cheaper than any other that has come to his notice.

[Mr. Malley's method, and results, correspond closely to those of BERLESE in Italy (1913). For an instructive account of his paper see *Review of Applied Entomology*, Ser. B. Vol. 1. p. 68.]

A. G. B.

ROSS (T. S.). **Flies in a Jail.**—*Indian Med. Gaz.* 1916. Apr. Vol. 51. No. 4. pp. 133-134.

The author was in medical charge of the Tanjore District Jail from November 1914 to November 1915. Though the jail and its surroundings were all that could be desired sanitarily, flies swarmed within the premises. Attempts to kill or poison them made little impression. A very careful search was made for accumulations of filth or refuse which might be acting as breeding places, without any satisfactory result.

"Special attention was paid to the trenching ground just outside the jail, where the faecal matter is trenched in the regulation pits each three feet square by five inches deep. In the bottom of each pit two inches of night-soil is spread and the pit is then filled in with the excavated earth. The trenching was carried out most carefully, and the five inch covering of earth seemed sufficient to negative the idea of the trenching ground being a source of the flies. . . .

"On opening one of the night-soil trenches, about a fortnight old, in order to note the extent to which nitrification had progressed, numerous fly larvae or maggots were observed even to a depth of five inches from the surface, and on scratching in the superficial earth covering of pits about a month old many pupae and pupa cases were found. Other pits were then opened and searched, and it was found that every recent pit was a most efficient fly hatchery."

The author proved that flies actually did emerge from the trenches by constructing a wooden frame with a wire gauze top and placing it over a series of pits. Flies were thus obtained from several, the highest number from any being 2,173. They began to appear about ten days after the filth had been trenched, reached their maximum in about a month and went on appearing for about another fortnight. When the larva is about to pupate it makes its way into the earth covering the excreta and when it is just under the surface it changes into a pupa, so that the more carefully the trenching is done the more securely are the larvae protected from their natural enemies the crows and the kites.

The author then sought to discover some method of destroying the eggs or larvae in the excreta before covering with earth. He tried crude petroleum and solutions of borax of various strengths and came to the conclusion that a quarter of a pint of crude petroleum sprinkled over them was efficient and more so than one ounce of borax. He calculates that the monthly cost of petroleum for the jail would be 2½ rupees, reckoning ¼ pint to a pit. He thinks that the flies were probably responsible for the spread of dysentery in the jail.

[ALDRIDGE (1904) described the breeding of house flies from trenched human excreta in India. FAICHNE, who has written several papers on this subject in relation to the spread of typhoid in India, urges that the shallow 12-inch trench should be abandoned (this *Bulletin*, Vol. 7, p. 34)].

A. G. B.

ATKINSON (E. L.). **The Fly Pest in Gallipoli.**—*Jl. R. Nav. Med. Serv.* 1916. Apr. Vol. 2. No. 2. pp. 147-152.

The means taken by the author to control the flies on Cape Helles are described in this paper. They consisted of *Musca domestica* and *Fannia canicularis*, breeding in manure, *Fannia scalaris*, usually found round garbage or in latrines, the blow flies *Calliphora vomitoria* and *C. erythrocephala*, breeding mostly in dead bodies between the trenches, and others. Most of the paper is concerned with the testing of Liquid "C," the result of experiments carried out at Cambridge by Dr. GRAHAM-SMITH and Mr. FOREMAN. It was found to prevent the breeding of flies in dead bodies, when sprayed in sufficient quantity, and to check decomposition, rendering them less offensive to the nose, to kill larvae for a depth of two inches on a portion of a manure heap on which it was sprayed, to repel flies for some days when it was rubbed on the wooden structures of messes, dug-outs and latrines and, sprayed in small quantities, to kill flies congregated in masses at night, for instance, on tarpaulins. A powerful pump should be used for spraying. "It is the best fly antidote that has been used so far." Its composition is not given.

A. G. B.

NUTTALL (George H. F.). **Ticks of the Belgian Congo and the Diseases they Convey.**—*Bull. Entom. Res.* 1916. Feb. Vol. 6. Pt. 4. pp. 313-352. With 48 figs.

This paper written, it is stated, at the request of the Belgian authorities is chiefly of interest to agriculturists. Of the species of ticks recorded from the Congo, one conveys relapsing fever to man and eight have been shown to convey diseases to domesticated animals in various parts of Africa. The paper contains a classification of ticks, together with a short illustrated account of species occurring in the Congo; an account of the general biology of ticks, and of their special biology and relation to disease; how to collect ticks and what to observe; and how to raise ticks. It concludes with a tabular index to Congo ticks and their hosts.

A. G. B.

BACOT (A. W.). **The Temperature necessary for the Destruction of Lice and their Eggs.**—*Brit. Med. Jl.* 1916. Jan. 29. p. 167.

The author states that *Cimex lectularius* die at 45° C. (113° F.) (BLACKLOCK and himself), fleas (*X. cheopis*), cockroaches (*Periplaneta americana*) and mosquitoes (*S. fasciata*) at the same temperature or a little higher. He describes his experiments with lice, *Pediculus humanis (vestimenti)*, which were obtained from two sources. He concludes that dry heat or submersion in water at 55° C. (131° F.) kills both active lice and their eggs. It follows, he states, that considerably lower temperatures than those usually employed may be used to destroy these vermin.

A. G. B.

TROPICAL DISEASES BUREAU.

# TROPICAL DISEASES BULLETIN.

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## APPLIED HYGIENE IN THE TROPICS.

By COLONEL W. G. KING, C.I.E., I.M.S. (Retired).

### REPORTS.

#### STRAITS SETTLEMENTS (1914).\*

This is written by Dr. W. GILMOUR ELLIS, Principal Civil Medical Officer. In discussing the fluctuation of population, he notes that the total strength has been affected by the repatriation of 11,000 coolies and others to China and India in connection with war requirements. The estimated general population was 759,105. The birth-rate for 1914 was 29.09 against 26.87 for 1913 per mille. The European population for 1914 is estimated at 7,883, with a birth-rate of 24.61 and a death-rate of 12.43 per mille. The death-rate of infants of the general population per mille of births was 250.23. In Singapore, plague caused 13, and cholera 240, deaths. A total of 101 deaths was recognized as due to typhoid. Deaths from beriberi per annum have declined as follows: 2,056, 1,926, 1,657, 1,483.

The subject of ankylostomiasis is receiving increased attention in the hospitals, 1,131 being treated in 1914 against 320 in 1910.

Owing to restriction of immigration, the Singapore quarantine station was little used for its normal function, but was usefully employed for receipt of enemy prisoners of war. On the other hand, the station at Penang had a busy time, as the pilgrims from Mecca returned in infected ships. A total of 13,682 pilgrims, with 54,728 packages of luggage, were dealt with, and 20,000 vaccinations were performed.

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\*The Straits Settlements Medical Report for the Year 1914.

## DISEASE PREVENTION.

## MALARIA.

*Malaria in a Hospital.*

In St. George's Hospital, Bombay City, malaria was found not to confine itself to the patients admitted for other diseases but to make attacks upon the nursing staff. A strong Committee was appointed by the Bombay Government to investigate the subject and submit recommendations. They found that in an average monthly strength of 63 nurses, five were attacked.

This Hospital is situated in Ward A of the Bombay City. In 1910, Dr. BENTLEY's examination of 52,000 children according to locality gave the following spleen indices\* :—

Ward.	Number of Children examined.	Number of Children with enlarged spleens.	Percentage with enlarged spleens.
A	5,944	1,783	29.9
B	5,980	781	13.0
C	12,025	711	5.9
D	7,532	208	2.7
E	11,646	213	1.8
F	5,513	66	1.1
G	3,896	41	1.0
Totals	52,536	3,803	7.2

Two years subsequently, the spleen index was 33.5 in A Ward. By 1913, it had declined to 15.87 and in 1914 to 13.77. In the Hospital compound, however, it was as high as 27. The Committee found that they were really called upon to pronounce an opinion upon conditions which had already been greatly improved, the improvement however being still incomplete. They therefore discovered no matter on which to place particular weight, but made the following observations† :—

"There can be little doubt that the anti-malarial measures which have been enforced (in the city of Bombay) have been largely responsible for the improvement in the health of the neighbourhood on which we commented in the previous section of our report. . . . It is necessary, however, to point out that the success of the campaign against malaria will depend greatly on the continuance of the work which is at present so energetically pursued by the Health Department. We would urge therefore that they should be encouraged to press forward all works which will be of permanent utility in the prevention of malaria, especially the covering of wells and cisterns in the infected areas. Unfortunately, there still remain a certain number of breeding places for *Anopheles stephensi* over which the Municipal authorities can have little control, *viz.*, collections of water stored intentionally or unintentionally in the houses of the inhabitants of the neighbourhood. Every effort therefore should be made to enlist the sympathy and support of the people themselves in the fight against malaria. They should particularly be encouraged to

\*Administration Report of the Municipal Commissioner for the City of Bombay for the Year 1914-15. Vol. II. Annual Report of the Executive Health Officer for 1914. p. 99.

†*loc. cit.* p. 101.

thoroughly treat all cases of malaria with quinine, for it is evident from the number of children, who are still found in the neighbourhood suffering from enlarged spleens, that many cases of malaria are ineffectively treated, and the danger of these cases lies in the fact that they are the source from which mosquitoes acquire their infective power."

In addition, they considered the question of rendering the whole hospital mosquito proof, but, having found this would cost Rs. 67,000, advised that a ward of 14 beds and one private ward be adapted at a cost of Rs.3,727.

### *Open Wells and Malaria in Bombay.*

The following is quoted from a Press notice issued by the Municipal Commissioner, Bombay\* :—

"It may be stated at once that no action has been taken in regard to any well unless it is found to be infected with mosquito-larvae. Out of the 3,313 wells, in A, B, C, D, and E wards, these larvae have been found in 2,202 which have been treated as follows :—

"348 have been filled in.

"770 have been hermetically covered—123 of which have been provided with hand-pumps.

"834 have been covered over with trap-doors allowed.

"In addition to these, 250 wells are under legal action, 16 for filling in, 108 for hermetical covering and 126 for hermetical covering with trap-doors allowed. It should be stated that nearly all of those that have been filled in entirely were altogether bad—many of them had not been used for many years for any purpose whatsoever and the owners made no objection to their being filled in. As regards those which have been hermetically covered, hand-pumps have been allowed in all cases in which owners desired to put them. . . . The permission to use trap-doors is, of course, open to very serious objection, from the point of view of efficient anti-malarial prevention. Trap-doors are constantly left open and frequently allow the entry of mosquitoes either through original bad fitting, or through defects in or injuries to the frame work. Out of 834 cases in which the trap-doors have actually been put in, in 119 within the last six months, action has had to be taken, because owing to imperfect closing of the trap-doors, the wells were found to be infected with anopheles larvae. The Standing Committee have, however, preferred that this risk of malaria infection should be undergone rather than that any religious prejudice of the people should be in any way offended, and have dealt with these cases with consideration and leniency. . . .

"It has now to be seen what good results have followed from the action that has been taken. This action has been, as will be gathered from what has been written above, only partial and not such as could be expected to produce entirely satisfactory results. Nevertheless the following table which is extracted from a report prepared by the Health Officer on the 7th May 1914 shows the improvement that has taken place :—

Ward.	Parasite Rate.			Mortality from Malaria.		
	1910.	1912.	1913.	1910.	1912.	1913.
A	34·8	10·54	2·98	80	91	65
B	13·1	3·01	2·89	78	101	47
C	34·5	14·14	1·88	50	58	53
D	3·8	0·00	0·00	29	22	24
E	3·8	7·97	5·45	37	56	47

\* Administration Report of the Municipal Commissioner for the City of Bombay for the Year 1914-15. Volume II. Annual Report of the Executive Health Officer for 1914, p. 106.

*Bengal. Malaria and Agriculture.*

Dr. BENTLEY, on the transfer of Major CLEMESHA, I.M.S., to the position of Sanitary Commissioner with the Government of India, now holds the post of officiating Sanitary Commissioner for Bengal. According to a Review of five public lectures, given by him, in the *Statesman* (Calcutta) of the 19th February, *et seq.*, Dr. Bentley finds there are papers "quoting the anti-malaria work done in America, Formosa, Ismailia and other places, and asking why measures of a similar nature should not be adopted in Bengal," also that "numerous remedies have been prescribed by different people. . . . The first of these was drainage, because some people thought water-logging was at the bottom of it, . . . . Another favourite remedy put forward by sanitary quacks was the clearance of jungle." Dr. Bentley having thus trodden on the tails of the coats of the "different people" and sanitary quacks who do not accord with his views, proceeds to show how "the disease must first be properly diagnosed and then the correct remedy applied." He considers "quack sanitation worse than useless."

Just as Dr. Bentley discovered that domestic wells afford shelter to anopheles mosquitoes in Bombay, subsequent to a similar statement some years previously by Major CORNWALL, I.M.S., in the City of Madras, so now he has brought again to notice the ancient fact that a sheet of water on land is more protective against malaria\* than a series of puddles; the correct explanation of which phenomenon awaited Ross, and details of the bionomics of the mosquito. On this one fact he founds much theory. He argues that the quack sanitarian forgets that the area of Bengal dealt with is not dry and elevated but delta land, that the cost of drainage is "prohibitive" because it entails pumping and, in any case, is unnecessary; as shown in the fact "staring them in the face that in those parts of Bengal where there was water-logging there was little or no malaria." His audience was assured that they must not make the mistake of supposing that "all the pools of stagnant water round Calcutta were the cause of malaria, or that by doing anything to them they would reduce malaria." He held that in dry elevated countries a little introduction of water might bring about an increase of malaria. The remedy there was to remove the water by drainage or some other means, but "in swampy countries like Bengal . . . instead of mending matters they would make things much worse."

In accord with this diagnosis Dr. Bentley declared "*the only remedy which could possibly have a beneficial effect in Bengal was the introduction of more water on the land surface.*" He considers the delta lands of the South of India owe their diminution of malaria to the introduction of large supplies of water under irrigation systems. No statistics are quoted to support his statement. So far as the Godavery District is concerned, in such statistics the hill tracts would have to be differentiated from the delta land; as to the Cauvery area, he refers to the great malaria epidemic of 1809-11 which, unfortunately for his theory, was distinctly the *aftermath* of extraordinary floods. Kyaupyo in Burma, which is naturally neither dry nor elevated, is another excellent

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\*[Major CHRISTOPHERS, C.I.E., does not accept this as to the Punjab.]



specimen of results of impounding water for irrigation; from being a favourite garrison for European troops, it has been degraded to a place of deadly malaria.

Now even quack sanitarians who favour drainage as an important, but by no means only anti-malarial method, are likely to be able to recognise that delta land under process of formation and formed land, respectively, cannot be expected to yield the same results as to mosquito propagation, in the presence of varying grades of surplus soil and surface moisture, and are likely therefore to require different engineering methods for relieving surface and subsoil water. On this subject, Reports\* reviewed in this *Bulletin* [Vol. 4, No. 4, p. 180 (Sanitation Number)] give much information as to Bengal soil and subsoil configuration. Indeed, space in this Note is saved by the writer referring not only to this Review† but to a letter in the *Statesman* of February 19th 1916, which, with the intention of defending Dr. Bentley, really gives his panacea away. The chairman at one of Dr. Bentley's lectures had stated he did not think the lecturer's views of water-logged areas agreed with his theory of decreased malaria, and illustrated this by citing the malaria stricken condition of Perojipur. The correspondent (H. P. GHOSE) then shows, "because Perojipur is a sub-division of Backerganj [an area liable to flood] it does not follow that it is inundated during the rains. As a matter of fact Perojipur is a sub-division of dying rivers and silted up channels." The vast difference necessary for the treatment of formed and still incompletely formed delta land (emphasized in the Review in the *Bulletin* above referred to) should suffice to show the simple fact that not provinces, but each petty area of a country possessed of an inhabited place to be protected must, within the possible flight of the mosquito, be regarded as the unit of sanitary survey and advice founded thereon, and consequently the usual formula of regarding the cost of drainage as "prohibitive," must take recognizance of estimates on reasonable data.

But, according to Dr. Bentley, floods and silt would restore agriculture to areas denuded of population and, therefore, a prosperous population would get rid of malaria. The efficacy of his panacea, with such mixed condition of soil, subsoil and physiography as presented by Bengal, however, Dr. Bentley evidently considers requires support; and assuming prosperity due to better agriculture as an effect of his method, he claims thereafter the disappearance of malaria. He quoted Ross for his support on this point—"it might happen that when the human population increased the local breeding of mosquitoes had reached its maximum output, in which case a decrease in the static mosquito ratio should result."‡ But whilst dilution of intensity of incidence by increased population is thus explainable, it is not apparent that Ross has suggested importation of human beings into a malaria stricken area by way of remedy. Moreover, the assumption of increased agricultural prosperity under conditions of water-logging would seem particularly ill founded; unless the elaborate experiments conducted by the Agricultural Department of India at Pusa and Madras are worthless, *soil aeration in agriculture is of prime importance.*

\* STEWART and PROCTER; FRY; Drainage Committee.

† At p. 190 in this Review, at the 8th line of the second paragraph, instead of "in the khals of a permanent character" read in the "bheels."

‡ *Statesman*, 6.2.16.

Consequently, in the absence of either natural or artificial means to secure entry of air into the soil in place of the water-filled voids of earth, the chances of agricultural prosperity are remote. Indeed, it is reasonable to believe that it has been in the attempt to realize this necessity that the agriculturist has shown throughout the world that successful agriculture, drainage and the abolition of malaria go hand in hand.

Irrespective of parts of Bengal to the East being of the type of recent delta formation and, therefore, in contrast with the older and formed portions to the West possessed of dead and dying rivers and peculiarities of physiography, and the consequent requirements of special methods for relief of surface and subsoil waters, a fact mentioned by Major CLEMESHA, in his Report on Sanitation in Bengal 1914, is worth remembering as to opportunities of extension of malaria in the East part of Bengal; he states [p. 16] that, in Western Bengal, the population is collected in large and compact villages, in areas well supplied with roads; "whereas villages in East Bengal usually cover a large area, individual houses are often widely scattered, and the few existing roads are often unpassable at certain times of the year."

In the meantime, whilst Dr. Bentley warns against quack sanitarians, and advises that it would be a mistake to suppose that "all the pools of stagnant water round Calcutta were the cause of malaria or that by doing anything to them they would reduce malaria," it is reported that of men making munitions in a factory at Ichapur, one thousand out of three thousand employed in January were absent owing to fever. In the Report just referred to, Major CLEMESHA states that, in Bengal, an increase of deaths from "fever" has been registered as follows:—1912, 959,193; 1913, 963,546; 1914, 1,061,041. It is satisfactory therefore to find that the Government of India is about to require a definite opinion as to feasible action from the various experts it has employed since 1909. In the meantime, the sale of quinine to the population of Bengal has been successfully increased without a diminution in fever mortality demonstrable by statistics.

#### *Tadpoles and Larvicides.*

On this subject the following extract from the Medical Report of the Straits Settlements for 1914, pp. 123–124 is of interest:—

"Amongst means employed for the destruction of mosquito larvae other than drainage and oiling, the stocking of suitable sites with larvacating fish and, suggested from Pennsylvania, the employment of ducks are measures which are of value and have their undoubted uses. Lately it has been suggested that in the Bahamas\* tadpoles are responsible for the absence of mosquito larvae in certain sites. This, if the case in the Bahamas, does not seem to apply to the tadpole of the frogs of Singapore, the most common species of which is *Rana limnocharis*. Commonly one meets tadpoles and mosquito larvae developing in the same site; and in experiments made the tadpole did not devour mosquito larvae—either anopheline or culicine. It is necessary to make a distinction between these two in this connection for the former larva in rest lies parallel with the surface of the water and it might be a difficult feat for a tadpole to seize a larva especially if one notes the position of the tadpole's mouth, except when the larva dives. On the other hand culicine larvae rest with their bodies at an angle to the water surface and could be readily seized by a tadpole. But I have seen such larva (stegomyia) remain confined in a small space with tadpoles unharmed for over 14 days."

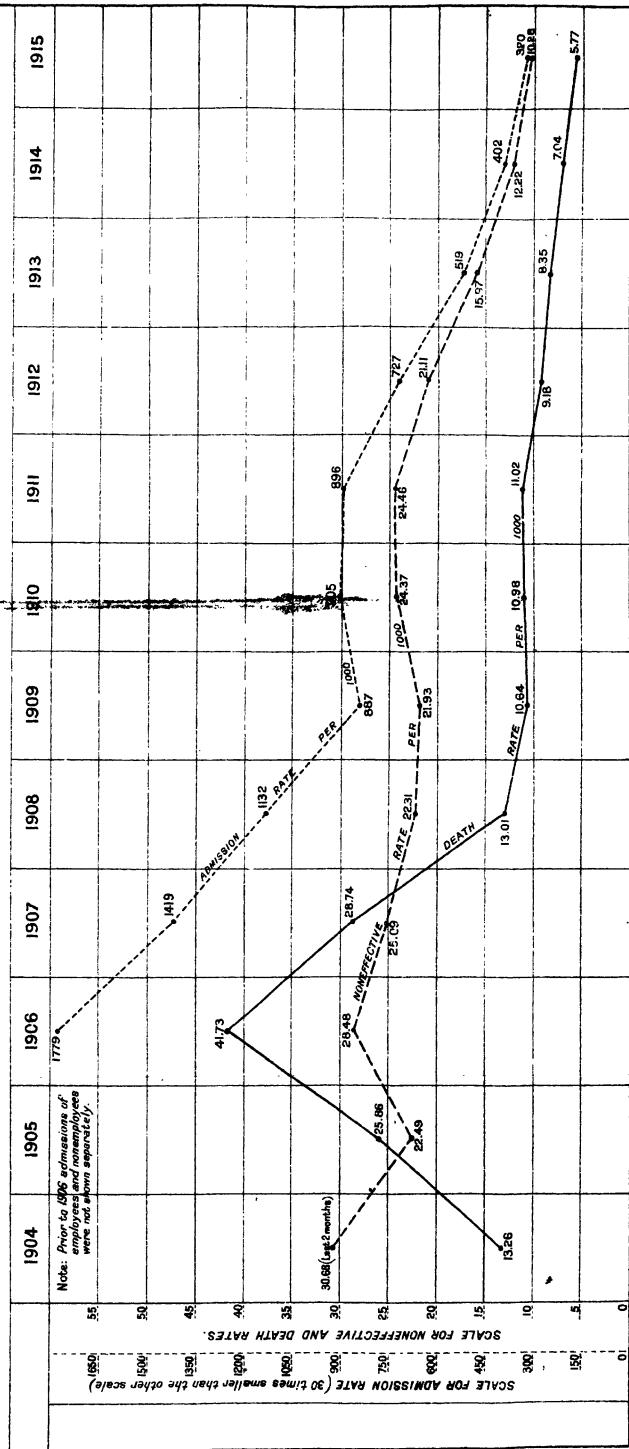
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\*[See this *Bulletin* (Sanitation Number). Vol. 4. p. 420.]



# ADMISSION, NONEFFECTIVE AND DEATH RATES PER 1000.

From all causes, by years,  
among employees of the I.C.C. and P.R.Co.



\* Constantly Sick

5377 MASH/100/1915 2 16



*Sanitary Measures on the Panama Canal.*

The annexed chart requires no text to convey its meaning. It is reproduced from the Report of Lt.-Col. MASON, in the Department of Health, Panama Canal, for 1915. Irrespective of the splendid results of sanitary effort by Surgeon-General GORGAS and his successor, the chart forces upon observation the rapidity with which the change for the better was effected. It affords a clear proof of the effect of masterly organization.

*The Wily Mosquito.*

Since Ross definitely inculcated the mosquito in malaria spread, its methods of ambush have been a constant source of surprises to investigators. The *Mansonia titillans*, according to the Report of the Department of Health, Panama Canal, for December 1915 (p. 8), in its early days, resorts to submarine methods. Lt.-Colonel MASON, Medical Corps, U.S.A., states that study of the breeding habits of this and allied mosquitoes is progressing. The question is of some importance since the larvae do not come to the surface but remain attached to roots of plants, and are therefore difficult to kill. The same authority, in his Annual Report for 1915, is by no means confident that, notwithstanding ten years labour to circumvent the mosquito in Panama City, complete absence has been secured. Thus both trains and tram cars have been found to import mosquitoes. Granted a train starts from Colon with no mosquito apparent, it arrives with a number proportionate to the stops and length of time of such stops. Small sailing vessels are also liable to aid importation by "water containers" on board being utilized by mosquitoes. He believes also that invasion occurs from a distance of two miles. So fully does the mosquito appreciate even a hollow caused by the footprints of cattle as a water receptacle, that it has been found necessary to impound "all cattle found straying on wet or marshy places." In September 1915, 1,744,400 square feet of jungle clearing was carried out with the result of many mosquito breeding places being reached; this was followed by the taking of measures which secured a rapid diminution. In Bella Vista, 15,000 feet of ditches were formed, so that at present it is not uncommon to spend an entire evening at Bella Vista without "encountering a single mosquito."

In his Report for December, 1915, Lt.-Colonel Mason states that punching holes in roof gutters will fail to ensure their not proving breeding places, owing to subsequent obstruction of these outlets by paper, leaves, rubbish and dust "converting them into containers." During that month, it was found necessary to remove 7,842 feet of roof gutters.

## PLAGUE.

*Hydrocyanic Acid Gas Fumigation.*

Important experiments have been carried out by officers of the U.S. Public Health Service on the above subject.\* The question of

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\*Surgeon R. H. CREEL, Assistant Surgeon F. M. FAGET, and W. P. WRIGHTON, Sanitary Engineer. Hydrocyanic Acid Gas—Its Practical Use as a Routine Fumigant.—*U.S. Public Health Reps.*, 1915. Dec. 3. Vol. 30. No. 49. pp. 3537-3550.

cost when compared with that of sulphur dioxide and carbon monoxide, the relative power of penetrability of these gases and their danger to human beings during employment, engaged their attention. It was considered that both in regard to cost and danger to human beings, the minimum strength found efficacious in killing rats must be a leading consideration. The conclusion was arrived at that, instead of 10 oz. cyanide of potassium per 1,000 cubic feet of space, half that amount was all that was requisite. Efficiency was aided by the employment of powdered cyanide of potassium, instead of the solid form. In regard both to the cyanide and to the sulphuric acid employed, they found no reason to prefer chemically pure material to the common commercial products. Compared with sulphur dioxide they ascertained that hydrocyanic gas had greater penetrability,\* and was more rapid in action; so that whereas six hours' exposure to the former would be necessary, the latter would secure full results within one hour. As regards danger to human life, the matter had to be considered in relation to the time that must elapse before entry could be made into a space recently fumigated, and the chances of contact with the gas during its first disengagement in a room or hold, if the operators be liable to be delayed by any manipulation of ingredients. On the first point, they concluded that [p. 3547] in any space where a circulation of "natural air currents can be obtained, there is no danger to men entering a place fumigated by cyanide gas 30 minutes after apertures have been opened. This interval of time is shorter than in sulphur fumigation, where the fumes are not sufficiently cleared from ships' holds for men to enter for varying periods of from one to three hours."

On the second point, they assert that "ordinary speed in departures from the room will likewise safeguard the operators in fumigations on land, when the cyanide is dropped by hand. . . . In the fumigation of a large warehouse the operators had to travel 100 feet from the container to the exit. This was accomplished without any noticeable effect."

To get over the difficulty of quick escape from ship holds before the closing of hatches, a simple but effective apparatus was devised by the officers concerned, which is thus described:—

"A. Ordinary wooden barrel, open at top, as the container for water and acid solution.

"B.-C. Five gallon tins, with tops removed, and pin hinges placed on one side 2 inches below the top, made to fit similar hinges on sides of D. These tins hold cyanide.

"D. Funnel of galvanized iron, 23 inches diameter at top, 12 inches perpendicular depth, 6 inches opening at bottom, series of 1-inch holes on sides opposite to hinges; hinges extending 2 inches above rim of funnel. It is intended that the acid and water mixture be placed in the barrel before it is lowered into the hold, the funnel to be then placed at the top of the barrel and the tins containing the cyanide attached to the funnel by means of the pin hinges. Ropes are attached to the bottom of the cans and passed over hatch combings. By simply pulling these ropes the contents of the cans are dumped into the barrel."

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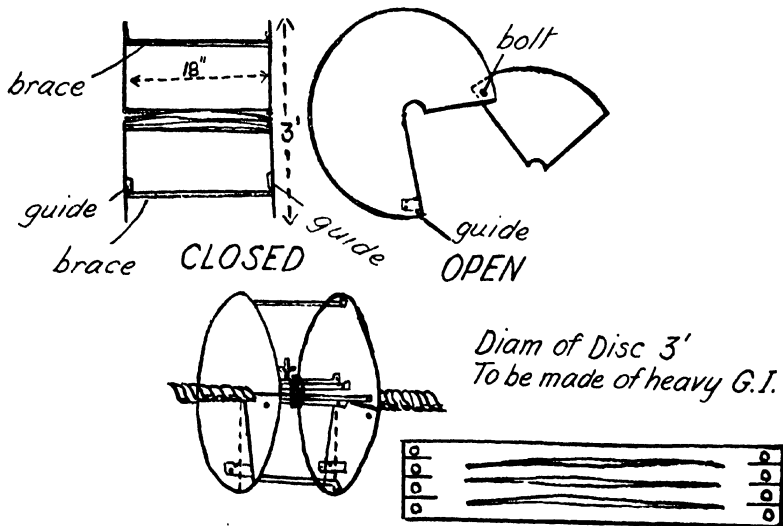
\*On this point see this *Bulletin* [Sanitation Number], Vol. 5. Feb. 1915-p. 160.

*Rat Guards.*

Surgeon MANNING\* suggests an improved rat guard; the plan given below may be compared with that shown at p. 371 of this *Bulletin* [Sanitation number, Vol. 3. No. 7]. It is thus described:—

"This rat guard is made of two disks of galvanized iron 3 feet or more in diameter, joined by four rods or braces of galvanized iron and a funnel made of sheet galvanized iron.

"Each disk is made up of two segments as shown in the diagram, or the disks can be cut as in the Fox rat guard [*loc. cit.*], and joined on one side by a bolt that acts as a hinge, a socket being provided to lock the two segments on the other side. The two disks are joined at the centre by a funnel made of sheet iron. The funnel is made up of two halves, one of which joins on the one side the two large segments of the disks and on the other the smaller segments. The central part of the funnel has long segments cut out as shown in the diagram [see figure].

*RAT GUARD FOR SHIPS LINES:*

*Sheet G.I. cut for 1/2 of funnel to line*

"After closing the guard over a ship's line, the central part of the funnel is tied to the line by a small piece of rope. This fastens the rat guard to the ship's line so that it cannot slip and completely closes the funnel and locks the two halves of the rat guard.

"The advantage of this rat guard is that it is always at right angles to the ship's line, and it would take considerable force to deform it or to flatten it out so that a rat could easily get over it. Also this guard is easily stored away without any danger of damaging it."

*Madras City and Plague.*

The following is a concise review of the Ninth Report of the present Indian Plague Commission by the Health Officer, Madras,† (Dr.

\*U.S. Public Health Reports. 1916. Apr. 7. Vol. 31. No. 14.

†Report of the Health Officer, Corporation of Madras, Health Department for 1914, p. 35.



MACDONALD, B.Hg., D.P.H.). Incidentally, it refutes the extraordinary idea propagated in literature on plague in India that such cases as have occurred in Madras City have been exclusively imported, and that no indigenous epidemic has occurred. After remarking upon the increased difficulties to be faced by the Sanitary staff in tracing importation of plague under certain recent relaxation of rulings, he states :—

“ No one who is responsible for the health of the city would rest secure on the supposed natural protective advantages of Madras, from its climate, and its low elevation. The fact that there have been, so far, 103 *indigenous cases of plague* (italics not in original) in this city, coupled with the high susceptibility to plague of the Madras rats, gives us no faith in the theory of natural immunity of Madras against plague. Colombo may serve as an example of this supposed immunity proving unsafe to be relied upon.”

### *Haffkine's Anti-plague Vaccine.*

. Embodied in the “ Reports on plague operations in the Shwabo, Sagaing and Lower Chindwin Districts ” (Rangoon : Superintendent, Government Press, 1915), forwarded by the Sanitary Commissioner to the Government of that Province, is a Memorandum by Lt. C. G. Crow, I.S.M.D., pointing to the great advantage of anti-plague vaccine—when accepted whole-heartedly by the people concerned. This condition was secured, in this particular instance, in a town of small population, 10,937, by the personal influence and enthusiasm of the officer concerned. His advocacy of taking the people into confidence as to delay of the highest stages of immunity instead of (as is so often the tendency with those urging inoculation) promising absolute freedom from attacks, and the mode of introduction of plague into Sagaing town (twice repeated) are noteworthy :—

“ For general purposes it will suffice to discuss only . . . Ratting, Trapping, and Disinfection.

“ Results in Sagaing have clearly shown that these measures were total failures.

“ In 1907, 1909 and 1910 large gangs of coolies were entertained at enormous expenditure. . . . All measures were thorough and sustained.

“ The results were unsatisfactory ; besides doing considerable damage to house property, the death-rate was high. The disease was scattered throughout the town by these driving methods.

“ A glance at the plague incidence will prove my statement.

1907 and 1908 = 63 attacks	} as compared with
1909 and 1910 = 153 attacks	
1913 and 1914, present epidemic = 9 attacks.	

“ *Trapping* was systematically carried out in the town. Trapping squares were made with considerable labour, and things worked like clock-work. Eight hundred traps were in continuous use. The check to the rat population and plague epidemic was practically *nil*.

“ The expenditure of buying traps, their upkeep and staff was considerable.

“ *Disinfection* was carried out in all infected houses, without any apparent benefit.

“ *Inoculation and evacuation.*—Inoculation was first started in 1907, and as was to be expected was very unpopular.

“ Meetings were held and officials readily came forward, with their wives and families, and had themselves inoculated as examples ; with all this only 820 cases were inoculated. Among these 820 not a single case of plague occurred and this fact helped us considerably in dealing with the next epidemic, 1909 10. Here again a good deal of opposition was

experienced, but by continual preaching and personal influence 4,284 people were done. Out of these 19 contracted plague and only 7 died. Out of the 7 deaths, 4 deaths took place from plague on third day after inoculation.

"Now this might be brought up as an argument against inoculation but it was not so, as the action of the plague prophylactic vaccine was clearly explained and great stress was laid on the fact that complete immunity was not guaranteed and that immunity was only practically conferred after the tenth day. Also it was explained that those contracting plague after the tenth day took a better chance of recovering than those not inoculated, and this is clearly borne out by our figures, much to the astonishment of the people. It was the fact that the whole action of the vaccine was thoroughly explained and prophesied, if I may use the term, that saved inoculation in Sagaing.

"The figures are as follows :—

Inoculated = 4,284.

Attacked with plague = 19.

Deaths from plague = 7.

Four deaths already explained.

Not inoculated = 4,467.

Attacked with plague = 134.

Deaths from plague = 128.

"The figures speak for themselves. Inoculation is so popular in Sagaing that it is now no longer found necessary to coax the people.

"In 1911, when plague threatened, 8,200 were inoculated, which is 78 per cent. of the total population. This will stand out as a world's record in the history of inoculation, except in the case of 1913-14, *i.e.* (the present epidemic), when 90 per cent. of the total infected area was inoculated."

"*Mode of Infection* (1914).

(1) Sagaing :—

Indigenous : Attacks = 7      Deaths = 7.

Imported : Attacks = 2      Deaths = 2.

Population = 10,937.

Plague was introduced into Sagaing by a dyer\* of *pongyi* robes. It was introduced by the same man in 1906 and in the same way. Two boxes of old *pongyi* robes were sent from Kemmendine to Sagaing for renewing and dyeing purposes. These boxes contained two plague rats. The rats in this house were first infected and rat plague was subsequently spread to neighbouring houses. The infection was introduced early in January and was only known to us in the third week. On opening the house, no fewer than 20 dead plague rats were found."

## TYPHOID.

### Queensland.

In the Annual Report of the Commissioner for Public Health (J. I. MOORE), Queensland, up to June 1915, it is reported (p. 66) that the Kargoolnah Shire Council has issued a special pamphlet urging the use of anti-typhoid vaccine, which is prepared and issued free by the Government Health Department. The Commissioner states (p. 4) that during his tours he has urged this subject upon the special attention of local authorities. The following is an extract from the circular referred to, addressed to "shearing contractors and others" :—

"1. That all station managers, at least a fortnight prior to date of commencement of shearing, notify the Clerk to the Kargoolnah Shire Council, by letter, of the proposed date, and that the doctor proceed to the shearing

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\*The dyeing of Buddhist priests' robes is a speciality in this town. In 1906, the robes to which infection was traced, had been brought from Rangoon.

site and inspect the premises and make suggestions, if necessary, for the improvement of the Sanitary conditions. 2. That every shearer, shed hand, musterer, and general station hand submit to inoculation against enteric."

*Trinidad and Tobago.*

The Report of the Surgeon-General (H. L. CLARE) for 1914-15 (p. 8) shows the incidence of typhoid in this area :—

		" Number of Deaths.	Rate per 1,000 living.	Proportion per 1,000 deaths from all causes.
1912-13	..	152	0.44	14.8
1913-14	..	104	0.29	12.08
1914-15	..	163	0.46	18.37."

These are but figures for registered deaths. The Surgeon-General considers that if the full figures were available " four times the number of deaths in each year would not be an extravagant estimate of the number of cases." After pointing out that existing legislation gives sufficient powers, he urges the prime importance of prompt notification. In the " Report of the Colonial Hospital, Port of Spain," which is embodied in the Surgeon-General's Report the following (p. 42) emphasizes this aspect of the subject :—

" It not unfrequently happens that an enteric fever case is admitted from a house where there have been shortly before one or more cases under the care of a private practitioner with whom no obligation lies to report to the Sanitary Authority. The danger of the spread of enteric fever to those nursing or coming into contact with patients is a serious one, though so much disregarded. To illustrate this point I may here remark that one of our nurses contracted the disease in hospital, where the danger is fully appreciated and every precaution taken to prevent infection. There was also a case of a patient contracting the disease in the institution. To better control this risk, certain proposals have been made to redistribute the patients so as to reserve a special ward for enterics."

*British Guiana.*

The following figures from the Report of the Surgeon-General (K. S. WISE) British Guiana, for 1914-1915 (p. 12) justify his warning conveyed in a former report of the importance of checking spread of typhoid, and of the necessity for special vigilance in the City of Georgetown :—

Year.	Death from fevers in the whole Colony.		
1901-1905	..	..	4
1906-1910	..	..	28
1911	..	..	76
1912	..	..	93
1913	..	..	106
1914	..	..	100

He is now able to report that, in the City of Georgetown, efforts are made to secure " prompt isolation and equally prompt disinfection of patients' premises," and that a special isolation block has greatly assisted these ends, " the majority of all persons suffering from enteric fever " being isolated there.

*Cairo.*

In this City, with an estimated population of 725,650, the incidence of typhoid cases was 1·941 per mille, compared with 1·017 per mille in 1913. This increased rate the Medical Officer of Health, City of Cairo, does not consider necessarily implies increased incidence; but is due to discovery of cases following orders to his staff to do their best to ascertain *the nature of cases of sickness* occurring in the houses of the poor and insanitary. This has resulted in an increase of numbers of cases admitted to Hospital (Annual Statement Report: Department of Public Health, 1914, Ministry of the Interior, Egypt, 1914).

Accepting, therefore, the Medical Officer of Health's suggestion that no actual increase of typhoid has occurred, it is satisfactory to find that, after many years of contention as to what system was to be used for lifting sewage in the flat area concerned, by April, 1915, the Shone system was installed, under Mr. JAMES, late Engineer, Bombay City.

*Hawaii.*

Results of anti-typhoid vaccination and statistics of typhoid amongst troops in the British Army have been at times held to be more favourable than the facts warrant, were it possible to exclude paratyphoid. Definite action in this direction, under the advice of Surgeon G. W. McCoy, Sanitary Adviser to the Governor, has been adopted in Hawaii. It has been ruled that cases are not to be reported as "para-typhoid" unless the diagnosis is supported by the result of the laboratory examination" and, further, that convalescent and recovered cases are to be kept under the control of the Board of Health, so long as the bacilli are being eliminated." (Annual Report, 1915, U.S. Public Health Service, p. 65.)

## BERIBERI.

*Beriberi in Lebong.*

At page 539 of Vol. 6 of this *Bulletin* [Sanitation Number], in connection with the etiology of beriberi, the writer suggested that it is not yet clear that those who hold other than the vitamine theory of origin are not dealing with forms of polyneuritis due to other causes, and so far not clinically distinguished from classical beriberi. FRASER and STANTON called attention to this aspect of the subject at the British Medical Association meeting of 1914.

Hence, in the Note referred to, opinions of those supporting the insect-borne theory of the disease were grouped together. In previous Notes\* will also be found opinions which would connect beriberi with food articles—more especially rice—which have been subjected to moulds or to conditions favouring the influence of damp†; and it was suggested that, as far as the important sub-pericarpal layers are concerned, destruction by moulds might be as inimical as by milling, and the possibility that other changes in grain which has been subjected to prolonged damp may occur, deserves notice.

\* Sanitation Nos. of this *Bulletin*, Vol. 5. pp. 167, 461; and Vol. 4. p. 214.

† A practical way of testing this theory would be to ascertain the vitamine contents of rice of the same stock preserved normally and subjected to influence of *prolonged* damp and moulds, respectively: or by careful feeding experiments. Indian customs recognize changes in the constituents of rice grain with advance of time after reaping.

In this connection, the epidemic of beriberi of 1913 amongst British troops at Lebong, where the medical officer in charge favoured the insect-borne theory, is of interest. The Committee, whose names appear in the Note above referred to, concluded definitely that the disease was beriberi, and that the "food of the troops could only be described as dangerously lacking in vitamine content."

An abstract of the Report on this subject by Major KENNEDY, R.A.M.C., is given in the *Journal of the Royal Army Medical Corps* for September 1915.

The conditions found at Lebong, coupled with the success described as attending the issue of a revised diet, are liable to be accepted, unreservedly, as a further proof of the vitamine theory of beriberi. Yet, on the above grounds, whilst in no way deprecating the value of the enquiry, the writer would suggest that in certain aspects it was incomplete, and that certain of its conclusions are "not proven."

The pros and cons of the subject may be conveniently considered in the order followed by Major Kennedy :—

*History of the Disease.*—Major Kennedy states :—"No record of a similar disease having occurred in Lebong prior to 1911 could be found." The Committee however asserted "that they considered that this disease had existed in the garrison at Lebong for some years but that the cases were of a mild type and difficult to be recognized."\*  
(<sup>1</sup>) It is also on official record asserted that "successive outbursts of the disease had occurred in different Infantry units stationed there (Lebong) in recent years."

*Climate and Climatic Diseases.*—Whilst these factors *plus* dietary are claimed as predisposing causes of beriberi, there is nothing to show how it happens that (<sup>2</sup>) "the troops at Jalapahar a mile or two away never suffered from beriberi." The Report asserts that of the King's Own Regiment 65 men contracted the disease at Lebong and 9 at Barrackpore,† but it is not attempted to show that in climate, climatic disease and the demands for exercise requirement, Lebong and Barrackpore differ from Jalapahar.

*Dietary.*—Against the Committee's assertion as to the food lacking vitamine content is the plain fact that "there was no apparent (<sup>3</sup>) difference between the rations the Lebong garrison received and those issued to other soldiers throughout India including Jalapahar." Major Kennedy however holds that "the meat at Lebong was deficient in fat, tough, and had an excess of bone. There is no doubt that the vitamine value of such meat must be low. Fresh milk and eggs were almost lacking," and the men, in spending their extra messing allowance "did not seem to select oatmeal, peas and barley. . . . The Government ration includes 2 oz. of flour, but these articles were not fully used." Now this is the sum of the suspicion of the diet "lacking dangerously vitamine content." Putting aside the absence of isolation of the elusive "vitamine," it surely was incumbent to show where the dietary, as served to the British troops, approached that of Barrackpore, and differed from that at Jalapahar and other parts of India. The only reason given for asserting lack of vitamine value as to the meat is that it was due to prolonged driving of animals (followed by a

\* (1), (2), (3) Report of the Sanitary Commissioner with the Government of India for 1913, p. 17 *et seq.*

†In 1913 there were 19 cases at Barrackpore.

fortnight's rest) prior to slaughter, and lack of good pasturage. But, allowing that Commissariat officers exercise discretion in requiring diligent search on the part of contractors, there is no evidence to show that the meat for troops gathered from famine areas (of which there has been no lack of instances) elsewhere in India has at any time disposed to beriberi. As to eggs and milk, it should not be difficult to show that amongst British troops there are plenty of men who habitually exclude such articles from their "extras," without contracting beriberi. It should also have been possible for Major Kennedy to have reported from the canteen and "coffee shop" records what extras the average soldier tends towards, and if they also were dangerously lacking in vitamine; whilst if the men's "predilection" at Lebong was not for such desirable articles as "oatmeal, peas, lentils or barley," it was necessary to prove that elsewhere, on the same Government ration, such articles were usually bought by the men.

Major Kennedy gives a statement of the nature of dietary under the original regimental arrangements and that as secured by him at increased cost, as follows:—

"E" Company, from July 1st to July 7th, 1913.

Breakfast	Cheese and onions.	Meat and salad.	Bacon and tomatoes.	Steak and onions.	Bacon and onions.	Butter.	Cheese and onions.
Soup	..	..	..	..	..	..	..
Meat	..	Roast	Stew	Roast	Roast	Stew	Roast
Pudding	..	..	..	..	..	Stewed peaches	Stew
Tea	..	Tea and bread; no extras.					

"A" Company, from August 2nd to August 8th, 1914.

Breakfast	Cold pork and sauce.	Porridge and butter.	Steak and onions.	Bacon and onions.	Eggs and butter.	Porridge and cutlet.	Butter.
Soup	..	..	..	..	..	..	..
Meat	..	Roast	Dhal Hotpot	Brown stew	Irish stew	Potato pie	Irish stew
Pudding	..	Currant	..	Rice	..	Treacle	..
Tea	..	Potato cutlets	Eggs and butter	Sausage tomato	Cold meat and salad	Potato pie	Butter
							Meat rissoles

Of the improvement thus secured of variety of cooking, but not necessarily of either weight or variety of material, in fact, there can be no doubt; but, in judging of this, the appalling entry in the old scale for tea—"tea and bread, no extras"—is discounted by the fact that it does not follow "no extras" were purchased by the

troops under the old arrangements, when expenditure in extras was voluntary. This possibility should have been verified by the canteen and coffee shop accounts. Ultimately a very special scale of dietary was sanctioned by the Government of India for Lebong, *but too late to influence in any way the troops originally infected with beriberi.*

*Loss of Weight.*—No weightment tests were available prior to the period of duty by Major Kennedy, and he points to the importance of loss of weight as a prodromal of beriberi. Weightments were instituted by him, but he concluded that “in spite of the improvement of the dietary of the Regiment, there was a general loss of weight during the year.” He has not “the least hesitation in attributing this to the climate, in other words to the rainfall.” This conclusion is emphasized by pointing to the fact that whilst rainfall is registered from towards the end of April to end of September there is none during October. Therefore, using Major Kennedy’s assertion as to decreasing weightments being prodromal of beriberi, the men during the months prior to October were, in spite of improved dietary, proceeding towards exhibition of that disease, and rainfall (increased air moisture) in spite of improved dietary, was the determining factor.

*Physical Training and Exercises.*—The severity of methods pursued Major Kennedy considers were, having regard to altitude, more than was desirable in the interests of general health of the men, and, under his advice, they were reduced. In support, he states that three of the four cases of beriberi, during 1914, occurred in A Company occupying bungalows 18 and 21, and that B Company had no cases, although “the two companies lived side by side in the group of four bungalows at the lowest and remotest part of the cantonment and had practically the same food.” This contrast Major Kennedy considers is accounted for by the fact that physical strain on A Company was greater than B Company, in that whilst in August B had rest A Company carried on company training.

But this possibility in one case should not be allowed to overshadow the important facts that Company A lived in bungalows which in 1913 had afforded 28 out of a total of 65 cases, nor that the physical training and company training in the case of E and H Companies followed each other within the rainy season as in the case of A Company; and, further, that E and H Companies were neither affected in 1913 nor 1914.

*Such facts should have tended to concentrate special attention on conditions affecting the inhabitants and the environment of bungalows twice previously exhibiting infection.*

*Diarrhoea.*—The cases of epidemic diarrhoea amongst the men would be at once granted (side by side with excessive physical strain if proved) as favouring decrease of resistance to any form of disease, and would be of special importance when a “diet-deficiency disease” is concerned. Hence Major Kennedy rightly places weight upon this factor. Indeed, the writer suggests it might fairly be held that diarrhoea would, in the presence of a diet-deficiency disease, be a more inimical factor than Company training—carried out under the care of technically qualified combatant officers. If this be granted, it is worth remembering that whilst Company B living in the same area and under the same condition of food as A Company (strength not stated in either case) had in July 11 cases of diarrhoea, A Company had 12. An analysis of the dates of occurrence shows that the initial symptoms of beriberi had more

reference to July than to August when B had the supposed benefit of rest. Hence, the contrast between Company A producing three cases of beriberi as against none in B becomes more striking.

*Accommodation and Hygienic Conditions.*—In the light of the above facts, any matter pointing to a connection between the occurrence of beriberi and particular quarters should be of special value. Thus, it is found that the men inhabiting the following bungalows were not subject to beriberi either in 1913 or 1914:—Numbers 1, 6, 7, 8, and 15. Major Kennedy states: “I have already referred to the fact that the six bungalows, numbers 16 to 21, with a nominal accommodation of 338 out of a total of 890, provided 30 out of 60 cases in 1913, and 3 out of 4 in 1914.” Now this is a most important statement when placed side by side with the fact that of the total of 21 bungalows five in neither year yielded a single case, and that the four cases that did occur in 1914 were solely in bungalows which previously yielded cases. Major Kennedy attempts a “partial explanation” by referring to extra strain on the men in the bungalows 16 to 21, and illustrates his theory thus:—“A man living in number 20 has to go three quarters of a mile (reckoned on the level) and climb a height of 425 feet. He probably does this before breakfast and at least once between breakfast and dinner. Then again the canteen and coffee shop are 730 yards distant and 375 feet higher up.” This method of stating the data available is however liable to misinterpretation. The term “375 feet higher up” might imply  $375 + 425$  feet which is inconsistent with the measurements afforded in the plan which accompanies the text, whilst as the canteen and coffee shop are at the same level as the parade ground, there is no reason why one of the two journeys to and from parade should not also include the visit to the canteen and coffee shop. Be this as it may, the difference in level between bungalow 20 (5,575 feet) and parade ground (5,970 feet) is 395 (not 425). But it is necessary not to fix attention on the facts solely as to bungalow number 20, but to ascertain what was really the *excess* height in the daily task of the beriberi subjects compared with those not so afflicted.

Now the bungalows numbered 14 and 15 get no special notice in the Report. Yet men from number 14 proceeding to the parade ground fulfilled 180 feet ascent and for the canteen 130 feet., whereas men from number 15 fulfilled 250 feet to the parade ground, and 200 to the canteen. Hence, if the ascent were the determining factor of beriberi, men of number 15 bungalow should have suffered more than those of number 14. Moreover, in the case of bungalow number 20 as against bungalow number 15, the comparative excess daily task was walking (presumably at leisure) and lifting the body through 195 feet. Major Kennedy's data however show that neither in 1913 nor 1914 were men inhabiting number 15 infected, whereas there were nine cases in 1913 in number 14 against an average of two in the bungalows other than 16 to 21, noted by Major Kennedy as specially affected.

If, then, this extra task of ascent does not seem the determining factor, there is at least one peculiarity shared alike by the bungalows chiefly yielding beriberi cases that cannot be ignored, and which is thus stated by Major Kennedy:—

“The bungalows on the western slope suffer most from this disability and are also more exposed to the prevailing damp winds. The dampness (C267)



of these bungalows was clearly demonstrated when I took up the flooring of one of the rooms (4 Bungalow 20). The majority of the men in this room were suffering from some ailment such as sore throat or diarrhoea, and complained of a smell. The earth underneath the flooring was damp and mouldy, and the musty odour was simply overpowering. The investigation resulted in my contracting a severe sore throat. . . . It is interesting to note that two of the bungalows (Nos. 6 and 7) *already have concrete basements and that no case of beriberi occurred in either of them in 1913.*" [Italics not in original.]

*Research.*—Major Kennedy failed to segregate any special organism from two human subjects post mortem, or to transmit the disease by inoculation of material to monkeys. He mentions the interesting fact that "dogs at Lebong suffer from a curious disease . . . the symptoms being fever, pains in the back and limbs, weakness of the legs and partial paralysis and loss of weight."

*Note.*—It would seem that whatever the ground for suspicion, there is no proof that the food of the troops was "dangerously lacking in vitamine"; improved resistance to the causative agent of beriberi probably was brought about by improved diet and decreased physical exercise; attention to the possibility of other than the vitamine theory of beriberi being applicable to the outbreak was not sufficiently met by the inoculation experiments, in that the material being derived from two old cases the organism of origin might have been absent, although results of its toxin in tissues might exist; notwithstanding the opinion of medical officers concerned prior to appointment of the Committee, no search was made for the presence of insects such as bugs and fleas, and no statement is made as to whether the officers responsible for the insect-borne theory had carried out any campaign against insects prior to the dietary changes, which may have modified results in 1914; having regard to incidence in 1914 of beriberi solely in bungalows infected in 1913, notwithstanding change of diet, neither "place" nor the insect-borne hypothesis are excluded, whilst, in view of the frequently reported occurrence of *beriberi in damp climates by observers elsewhere, and the existence of moulds in habitations and in food articles*, the conditions described in bungalow 20 and the connection between general health and rainfall (vide para. "Loss of weight" *supra*) were so marked as to have demanded special experimental enquiry, without which the investigation was incomplete; the Report is also incomplete in that no note is made of food conditions at Jalapahar and Barrackpore nor indeed in India at large, in the face of similar and definite rations being allowed British soldiers wherever stationed.

#### *Beriberi in the Malay States.*

Drs. FRASER and STANTON have not been content with putting on record their views as to the importance of the subpericarpal layers in rice in the etiology of beriberi; they have put to the test the opposing insect-borne and place-disease theories. An interesting summary of their observations is given in the Annual Report of the Institute of Medical Research, Kuala Lumpur, for 1914. Drs. Fraser and Stanton have assumed no dogmatic attitude in the matter. They grant, as also conceded by LOVEFACE of Brazil, that elsewhere forms of polyneuritis may occur which are clinically capable of being classed as

beriberi, and which future investigations may prove to be due to causes other than dietetic; but state that, so far as the disease as witnessed by them in the Malay State is concerned, it is strictly connected with an error of preparation of the rice in the case of those using rice as the staple grain. This may be more or less the issuing a challenge to those supporting other theories, but it is at least eminently fair.

Against the insect-borne theory in the Malay States, the Report gives instances of persons affected with beriberi on polished rice diet being purposely mingled with the healthy subsisting on unpolished rice; so that all possible opportunities were afforded of bugs, fleas, or lice being transferred with personal property and even with residences. The result is thus stated [p. 3]:—

“Within one month there occurred in the polished rice party five further cases of beriberi, while no sign of the disease appeared in any member of the unpolished rice party.”

Without attempting to throw doubt upon the direct connection between the absence of the sub-pericarpal layers of rice and beriberi, it is possible for objectors to hold that, as the prodromal period of beriberi is about three months, a more prolonged period of observation was desirable, and that the proportion of cases actually suffering from beriberi introduced into the healthy group is not stated; and, further, that if air moisture be a favouring condition of the causative agent a statement of the particular month during which experiments were conducted was desirable. In this connection, it is worth remembering that in an epidemic in the Thayetmyo Jail, Burma, in 1882, which was then bug infested, the Burmans resident together in special wards were infected, whilst Indians in separate wards remained free although the same diet was used. In this jail an enormous and mouldy mound of husk of the unpolished rice used was a remarkable sanitary coincidence.

Apparently, in the experiments of transfer of property, the presence of ecto-parasites was assumed, and it would certainly in practice, in any case, be a mere question of the proportion of parasites in relation to time and opportunity; so that to this extent the experiment is incomplete, although in other respects convincing. This is to be borne in mind, as qualifying the criticism in the Report of the advocacy of STANLEY, DAVIS and ARNOLD of the insect-borne theory. The following is Dr. Fraser's statement on the subject [p. 4]:—

“The evidence which Dr. Stanley has obtained in regard to the Shanghai Gaol is briefly as follows: The number of cases of beriberi since 1899 has been: Old Gaol, 1889, 27; 1900, 34; 1901, 134; (*modified diet introduced*) 1902, 0; (*prisoners transferred to New Gaol*) 1903, 0; 1904, 2; 1905, 2; 1906, 2; 1907, 1; 1908, 5; 1909, 78; (*recommendations as to destruction of vermin introduced*) 1910, 16; 1911, 7; 1912, 2.

“The modification in diet recommended in 1901 was followed by a fall in the number of cases from 134 to 0, other conditions remaining the same; the recommendations regarding the disinfection of vermin of 1909 were followed by a fall in the number of cases from 78 to 16.”

In favour of the vitamine theory, the fall from 134 in 1901 to 0 in 1902 is striking, but also is the increasing incidence from 1903 to 1909, significant of possible infection of the new jail, accompanied as it was by a period of special destruction of vermin. The inevitable policy, in the presence of manifest room for further investigation, is “wait and see.”

## VACCINATION.

*Inspection of Vaccination Results in Rural Areas.*

The Annual Vaccination Report for the Punjab 1914-15 (p. 3) shows that the pronouncement of successful vaccination depends considerably upon the personal equation of inspecting agencies. For primary vaccination Civil Surgeons, Divisional Inspectors, Superintendents of Vaccination and Vaccinators reported the following success rates, respectively :- 93.61, 94.65, 95.66 and 97.13. The hopeful character of the Vaccinators' results are sufficiently remarkable, when contrasted with the findings of other agencies, to suggest a want of rigidity in arriving at a judgment. On the other hand, the results of verification by Inspecting Officers is liable to differ in accordance with their ability to circumvent an artful vaccinator.

In working rural areas the Inspecting Officer has a rough time before him, and an intelligent vaccinator is prepared to make matters easy by securing the assembly of children at a certain spot except those unfortunately absent in the fields or on visits to their relations which, being interpreted, may mean the majority of the unsuccessful cases. To overcome this difficulty, the toilsome method of house-to-house inspection, or a sudden morning descent upon a village, will occasionally aid in obtaining the bare truth.

But the Madras Presidency has for some years adopted methods under what is known as the "trial scheme"\* which relieves vaccination statistics of the ideal figures rendered by the too optimistic vaccinator.

Both vaccination and registration of Vital Statistics are compulsory in the rural areas concerned. The Village Officials, according to pre-arranged programmes, are bound to produce all unvaccinated infants in their village before the vaccinator on a certain date. The operations having been performed by well-educated and trained vaccinators, the results are left for inspection by Deputy Inspectors of Vaccination, who also work in accordance with a pre-arranged programme, and inspect immediately behind their vaccinators, so as to arrive at each village concerned within the days of vesiculation. This system secures much economy of staff and in verification leaves nothing to the imagination of vaccinators. It is to be understood that none but preserved animal vaccine is employed and that consequently, a return of the vaccinator to ascertain nature of vesiculation or to secure a stock of lymph is not necessary.

*Cultivation of Animal Vaccine.*

The successful cultivation of animal vaccine under tropical conditions on a large scale cannot be conducted by rule of thumb methods. There are difficulties to be met as to temperature, air, moisture, breeds of cattle, means of feeding, etc., in endless variety; but these having been overcome, there is forced upon the operator the plain fact that there are conditions daily met with which cannot be explained by present day knowledge. These are closely allied with

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\* Because it was first employed experimentally in specified districts.

the problem of immunity, and afford, somewhat tantalizing, if interesting items for investigation. To get rid of some of the doubtful factors has been attempted on a systematic scale by Lt.-Col. GIBSON, I.M.S., Director of the King Institute, Madras.

*The Vigour of Vaccine.*—Experiments were conducted with the object of securing a robust seed lymph, by checking the growth of extraneous micro-organisms in lanoline vaccine. He states :—

“Glycerine of course does this ; but at Indian temperatures it is also very injurious to the vaccine. Desiccation was tried, the vaccine being first incorporated with five times its weight of milk sugar. The idea was to render the dried vaccine more readily soluble as well as to dilute it. A material was got which produced good but somewhat delayed vesication on calves. It did not however show any great keeping qualities and as its manipulation was definitely more complicated than that of lanoline vaccine this attempt was abandoned. Further experiments are in progress.”

*The Yield of Vaccine Pulp.*—Major PATTON, I.M.S., Assistant Director, as stated in this *Bulletin* [Sanitation Number, p. 167, Vol. 5, No. 3, 1915] considered that by subjecting vaccine pulp unmixed to the action of cold, a change was produced which brought about increased bulk of vesicle pulp on this being used for seed lymph. Experiments made by Lt.-Col. Gibson to verify this produced unsatisfactory results, as to success rates, when compared with those obtained with stored standard lanoline vaccine. At the same time he reports that “the yield per calf was certainly larger than in the previous year.”

*Variability of Results on Individual Calves.*—On this subject the following extracts from the original Report\* are quoted :—

“From a certain date every calf admitted into the Institute was classified under the following headings :—Admission number, Serial number, Sex, Size, Colouration of skin, Texture of skin, and Surface feel of skin. On vaccination and pulping, the period, quality and appearance of the lines together with the yield per calf were noted in corresponding columns. Over 500 calves were so examined. The texture of the skin being considered as probably the most important, the average yield per animal was calculated in the following groups :—

“Thin and soft skin—that is having little subcutaneous tissue but the actual skin of loose texture.

“Thin and hard—having little subcutaneous tissue but the skin of dense firm texture.

“Thick and soft—Thick and hard—having subcutaneous tissue and with the actual skin of loose and dense texture, respectively. . . .

“Further analyses were made with regard to the varying points of the animals, but in these it was endeavoured to test the virtue or the reverse of any particular point by its effect on the percentage of animals showing :—

“(1) Specially good vesiculation (that is selected for seed lymph). Quality good.

“(2) Total failure of vesiculation.

“(3) Yield more than three grammes above the average, *i.e.* good quantity.

“(4) Yield more than three grammes below the average.

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\*Annual Report on Vaccination in the Madras Presidency and on the work of the Vaccine Section, King Institute of Preventive Medicine, Madras. 1914-1915.

"Table XIV. gives these results :—

TABLE XIV.

			Specially good quality.	Failure.	Specially good quantity.	Yield small.
			Per cent.	Per cent.	Per cent.	Per cent.
Skin colour.	Cow	.. ..	5.4	5.0	13.0	4.2
	Bull	.. ..	7.7	7.7	3.85	0.0
	{ Large	.. ..	4.5	{ 5.7	17.0	{ 3.4
	{ Medium	.. ..	5.3	{ 4.1	12.0	{ 4.4
	{ Small	.. ..	10.7	{ 18.0	7.1	{ 0.0
	{ White	.. ..	7.7	{ 3.8	11.5	{ 3.8
	{ Tinted	.. ..	6.2	{ 3.6	10.8	{ 3.6
	{ Pale pigment	.. ..	5.2	{ 5.6	12.45	{ 4.4
	{ Dark pigment	.. ..	3.6	{ 9.0	18.2	{ 3.6
Skin surface.	{ Smooth	.. ..	8.6	{ 6.45	6.45	{ 5.4
	{ Slightly rough	.. ..	5.1	{ 4.36	13.3	{ 3.6
	{ Harsh	.. ..	1.9	{ 7.7	15.4	{ 3.8

"The number of bulls was so small, only 26, that much weight cannot be laid on the results got with them, and therefore a sex comparison cannot be made.

"In the other groups however there appear to be fairly well defined relations, and for convenience of reference the various groups of figures have been bracketted in contrast to one another. A consideration of the table as a whole shows that the characters, which yield a specially good quality of lymph, are different and sometimes sharply contrasted to those which yield a good quantity.

"(a) Size of animal, where good quality is concerned. Here we see that small animals are better than large, but where a large quantity is concerned the larger the animal the better.

"(b) Size of animal in relation to failure. Here an exceptionally large percentage of small animals are found. Probably these were badly nourished animals, and the large number has something to do with an absence of small animals in the heading "small yield."

"(c) The figures for pigmentation are very instructive. In relation to good quality and failure they are sharply contrasted and also in relation to good quality and good quantity.

"(d) The same strong contrasts are shown when the surface of the skin is considered. Smooth skins give good quality but small quantity; harsh skins poor quality and large quantity.

"A further analysis of the table would probably yield other results and as time permits this will be carried out.

"Where any selection on purchase is for practical reasons impossible, the points elucidated may enable us to ensure a steady supply of lymph of fair quality."

## Food.

### *The Grading of Milk.*

There is increasing insistence by Sanitary Officers as to milk purity; but there are so many factors to be taken into account beyond the single dictum that the milk must be pure, that the methods advised by them for securing protection, necessarily, differ largely. In the first place, there is the plain fact that the public, whose safety is concerned, is rarely dissatisfied with milk whose richness is more apparent

at the bottom than at the top of a white fluid, more especially if they are required to pay an enhanced price for a less artificial product. In the next place, the possessor of cows fails to see why he should be required to expend money in supplying the animals with luxurious byres, and worry about the cleanliness of the milker's hands, if he be not allowed to increase the cost of milk. Thus, a spirit of compromise is liable to undermine the sanitarian's dictum, and a variety of standards have been evolved.

The President (J. F. ANDERSON), American Health Association, has recently\* insisted upon the importance of milk being graded, so that the public shall have the opportunity of buying milk that is possibly impure or, for a better price, obtaining a safe supply. He puts this argument in a forcible manner : —

"It has always been one of the things which the writer could never understand why the idea seems so deeply rooted in many of those who have to do with the milk industry—producers, inspectors, and consumers—that the farmer or the dealer who sells a clean milk, and therefore a safe milk, should not receive a higher price than his neighbour receives for a dirty, unsafe milk. The establishment of grades and standards for milk will cause this idea to disappear."

He objected absolutely to the principle of "one quality— one price of milk."

There are endless arguments that could be brought to bear both for the pros and the cons of the contentions thus made. Probably, to most persons, instead of these two compromises with purity, a third would appeal : a minimum standard purity, and a graded excellence at enhanced rates. On the other hand, at least one large city (Rangoon) has met the demand for inferior quality half-way by legalising the selling of "watered milk."

Grading milk, if conscientiously carried out, demands a consideration of numerous factors. A method for estimating their influence has been elaborated by W. C. WOODWARD, Health Officer, District of Columbia. As advocated and carried out by means of a large staff of Inspectors, the personal equation in judging is largely eliminated, and thus a possible objection is capable of being met. Without entering into details, it will be seen from the following quotation that he has worked out a system which is fair both to the consumer and producer :—

"100 points are allowed for the dairy farm, both equipment and management ; 100 points are allowed for the cattle ; 100 points are allowed for the milk distributing station, if the milk is not distributed directly from the farm ; 100 points are allowed for the bacteriological examination. The total number of possible points is 600 if there be a milk-distributing station, and 500 if there be no such station. By dividing the total number of points allowed by the total number of points possible a figure is obtained in the form of a decimal fraction representing the grade of the milk. Any unusual conditions bearing upon the nutritive quality of the milk or on its wholesomeness, but not susceptible of being reduced to a percentage basis, are to be set forth in an explanatory note, if the grade is computed during the continuance of such conditions ; such, for instance, as a milk-borne outbreak of typhoid fever or other contagious disease."

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\*U.S. Public Health Reports. 1916. Jan. 7. Vol. 31. No. 1. p. 5.

But figures so obtained could not apply to a milk which is the mixed product of several farms. He illustrates the method of dealing with this condition as follows :—

“The method may best be understood by a simple illustration. Producers A, B, and C all send their milk to Dairy No. 342. A has 100 cows, scored 100. B has 50 cows, scored 80. C has 10 cows, scored 40. To determine the rating to be allowed for the cattle in computing the final score :—

Producer.

A . . . .	(number of cattle)	100	(multiplied by score)	100 = 10,000
B . . . .	(number of cattle)	50	(multiplied by score)	80 = 4,000
C . . . .	(number of cattle)	10	(multiplied by score)	40 = 400
				— — —
				160
				— — —
				14,400

Dividing the sum of the multiplied score, 14,400, by the total number of cattle, 160, the quotient is 90, the rating to be allowed for the cattle in determining the grade of milk distributed by the common distributing agency, Dairy No. 342.”

An ancient Hindu method of grading milk was recently represented to the Calcutta Corporation by the Bengal Landholders' Association, as suitable for adoption in making a standard for milk in that city. It is apparently based on a liberal allowance for the total solids of milk in the form of curds, and would, at least in the absence of the more simple method of employing the lactometer of the present day, indicate adulteration by water; but the method is at least of interest as an early effort towards “grading” milk. Under this system, a contract for first service (secured by means of monetary advances) was made by sweetmeat makers with milkmen, and they paid according to the following standard :—

“Each seer (2 pints) of milk must yield  $\frac{1}{4}$  seer of curds. For milk reaching this standard the sweetmeat maker paid a rupee for 16 seers, but if, for example, the proportion was four seers of curds in 20 seers of milk the payment would be for 16 seers of milk only.”

### *A Milk Standard for India.*

This subject has had much attention at the hands of Dr. Lemuel Lucas JOSHI, Analyst to the City of Bombay Corporation. The work undertaken by him to arrive at his conclusion must have been of a most arduous nature. He found that the quality of milk differs materially with the breed of animals, so that whilst the standard suggested by him is correct for Bombay and Western India, he considers it would be desirable for legal purposes, were the various areas of the country to form local milk standards. As a result of analysis of

500 specimens of milk, he gives the following composition of buffalo and cows' milk, respectively\* :—

	No. of animals examined.	Total Solids per cent.	Fat per cent.	Non-fatty Solids per cent.	Specific Gravity at 60° F.
1. Buffaloes' Milk :—					
Series I. . .	271	17.11	7.62	9.57	1,028.8
,, II. . .	205	17.40	7.87	9.53	1,030
2. Cows' Milk. .	50	14.89	5.79	9.10	1,029

From these analyses, he would deduce the following standards :—

Proposed Milk Standard (Chemical), for Bombay and Western India.

	Fat per cent.		Non-fatty Solids per cent.	
	Average.	Lowest legal limit.	Average.	Lowest legal limit.
Buffaloes' Milk . .	6.5 to 7.5	5	9 to 9.5	8.5
Cows' Milk . .	4 to 5	3.5	8.5 to 9	8.0

As to bacterial standards, he gives the following opinion :—

"As regards *Bacterial Standards for milk*, it may not be considered desirable at present to adopt them for *legal* purposes but undoubtedly they would be very useful as guides for *administrative* purposes. Besides, the present bacteriological investigation is probably the *first* one of its kind in India and further research would be necessary in other parts of India before a definite standard can be arrived at. In the meantime in the light of the results already obtained in Bombay the following *Bacterial standard for Bombay Milk* is suggested as a provisional measure :—

"(a) *Microbes per cc.* : These should not exceed two millions in the cold weather (November to March), and five millions during the hot and rainy seasons (April to October); (b) *Lactose Fermenters* : They should be absent in a dilution of 1 : 100 in the cold season and 1 : 1000 during the other seasons; (c) *Microscopic examination of the sediment* should show only a few leucocytes and perhaps a few cocci and bacilli, but pus cells and (pathogenic) streptococci should be always absent; (d) *pathogenic microbes, e.g.,* Tubercle Bacilli, Cholera vibrio, B. Typhosus, etc., should be always absent.

"The comparatively favourable bacterial results obtained in samples of milk, which were pasteurised and then kept constantly at a temperature under 50° F., demonstrate the advantages of pasteurised milk over raw milk."

\*Administration Report of the Municipal Commissioner for the City of Bombay for the Year 1914-15. Vol. II. Annual Report of the Executive Health Officer for 1914. p. 124.



*Vitamines.*

It is a much easier matter to assert that such and such a food substance lacks vitamine than to demonstrate a vitamine when present. In the Hygienic Laboratory, U.S. Public Health Service\* the subject has been investigated in a practical manner by Atherton SEIDELL, Technical Assistant. He conceived that yeast might be likely to yield a readily demonstrable amount. Of this, from a brewery, he was able to obtain large amounts of material that was regarded as waste. This was subjected to hydraulic pressure, so as to remove traces of beer. It was then washed with water and again pressed. The cake thus made was

"placed in enamel-ware vessels and brought to a temperature of 37.5° C. and held there for a period of about 48 hours. The autolysis is more or less complete at the end of this time and the material converted to the consistency of thick soup." This is then filtered, and if the filtrate be "administered in 1 cc. doses on alternate days to a pigeon kept on an exclusive diet of polished rice, the pigeon does not lose weight nor show symptoms within at least two months, the period during which the present experiment has been under way. A pigeon kept on polished rice without the yeast filtrate begins to lose weight usually within the first five days and dies with the typical paralysis of polyneuritis within about 20 days. If 1 cc. of the yeast filtrate is given to completely paralyzed pigeons a relief of the paralysis will occur within an hour and to all outward appearances the pigeon will be restored to a normal condition within 12 hours."

This preparation therefore contained the active vitamine, but as from comparison with the weight of a pigeon 200 cc. would be required for a man, concentration was evidently desirable. This he has accomplished by using the selective powers of a special preparation of hydrous aluminium silicate, as used by Professor LLOYD for separation of alkaloids. Having proved by experiments in pigeons the presence of vitamins, Seidell next attempted to secure an activated solid. This he managed by adding 50 gram per litre of LLOYD's colloidal hydrous aluminium silicate to a large volume of clear autolyzed yeast filtrate. This is well shaken and allowed to deposit, aided by a small amount of hydrochloric acid. The recovered solid is well washed and dried in vacuum desiccators.

"Both preventive and curative experiments on pigeons have been made with this material, and the results agree with those already described and illustrated . . . for the product made with the ratio of 200 grams of reagent per litre of yeast filtrate. It has been found that prompt and effective cures of completely paralyzed pigeons result from 0.05 gram doses of the activated solid, corresponding to 1 cc. of the original yeast filtrate. Preventive experiments, continued at present for over a month, using 0.05 gram of the solid on alternate days, show that the pigeon retains its normal health and weight on an exclusive diet of polished rice."

These experiments mark a decided advance in both preventive and curative measures against food deficiency diseases.

*Vitamines and Pellagra.*

This subject is discussed in a communication to the *U.S. Public Health Reports* of April 14th, 1916.† The authors refer to the com-

\*U.S. Public Health Reports. 1916. Feb. 18. Vol. 31. No. 7. p. 365.

†By Carl VOEGLIN, Professor of Pharmacology, M. X. SULLIVAN, Biochemist, and C. N. MYERS, Technical Assistant, U.S.A. Public Health Service.

position of highly milled wheat and corn flour as contrasted with the stone milled products of former days. They place no stress on the different chemical composition of such flour, beyond saying that they "contain less protein, fat, and ash" than the old fashioned products, but hold that a perfect analogy exists

"between the well-known relation of the polishing of rice to its nutritive value, and the milling of wheat and corn to the nutritive value of wheat flour and corn meal. In the case of beriberi, numerous observations have demonstrated the fact that, if the diet of people is largely made up of highly polished rice and is otherwise deficient in vitamins, beriberi will make its appearance, whereas, if undermilled rice is substituted for the highly milled variety, the disease is not so likely to break out. Little reports an outbreak of beriberi among the fishermen of Newfoundland, who lived mainly on bread made from highly milled wheat flour."

They grant the difficulty of isolating the vitamins in wheat and maize flour, but hold FRASER and STANTON's method of using the phosphorous content to be a sufficient indication.

They suggest for maize flour that "the  $P_2O_5$  contents should not be less than 0.50 per cent." The test is unsuitable for "self-raising" flour, as it contains a baking powder composed of phosphates.

Holding that the experiments of SULLIVAN and VOEGTLIN have established that alkalies have a destructive action on vitamins (especially conjoined with high temperature) they point to the fact that the present day highly milled flour products are liable to further alteration as to vitamin contents in the process of cooking bread. Formerly, it was the custom to use sour milk and soda for production of  $CO_2$  during baking; but the present tendency is to do without the sour milk, and hence the alkali is not neutralized but remains to destroy the vitamins.

Of the influence of these facts, they give experimental proof conducted on fowls. They find "that corn bread prepared by means of baking soda without the addition of buttermilk is deficient in certain essentials, accessory foods (vitamins) and that this deficiency is due to the destructive action of the alkali (baking soda) on the vitamins which were originally contained in these foods."

On this basis, they direct attention to the occurrence of pellagra following changed economic conditions of populations in certain parts of the United States. They state that

"in Spartanburg County it is evident that a large proportion of the people, especially in mill villages, live on a diet which is deficient from the point of view of its vitamin content. Wheat biscuits made from highly milled wheat flour and corn bread made with baking soda without the addition of buttermilk are the staple articles of diet among the people, and we have found families in which these foods represented about three-fourths of the entire diet. The fact that the above-mentioned influences, which have undoubtedly reduced the vitamin content of the diet, made themselves felt a relatively short time before the rapid increase in the pellagra incidence in this section of the country, furnishes considerable evidence in favor of the vitamin-deficiency theory of pellagra. It will be left for future investigations to prove or disprove the correctness of this assumption for other pellagrous sections of the South. The reported results emphasize the fact that, in studying the etiology of any disease which is assumed to be of dietary origin, it is essential to pay careful attention to what might appear on superficial examination as trivial details."

The evidence these authors have furnished as to influence on dietary of a particular method of cooking bread is undoubtedly of importance,

and will aid future investigation in such points as duration of high temperature for cooking cereals, the use of added alkalis, and the nature of water employed ; but, if the vitamine theory is to fit into pellagra etiology—as it well may—there is a vast gap to be filled in between the polyneuritis of chickens and the particular variety of vitamine (of the possibly several forms) from the absence of which the pellagrous subject suffers. The bulk of populations in the famines of India have not suffered from acute but chronic starvation, extending over many months ; such populations should produce a reasonable number of cases of polyneuritis, beriberi, and pellagra, by reason of absence of vitamines. In the case of the great famine of 1876–1878 in the Madras Presidency, the only grain available in certain parts of the country was Burma *milled* rice. These diseases were not recognizable—a fact which, at least, points to the vastness of the whole subject and the importance of identification of vitamines as separate entities with individual functions, if the use of the term is not to become a convenient method of hiding professional ignorance, in accord with the “ catalytic action ” which did much service in the same cause in the seventies.

#### WATER PURIFICATION.

\*An experimental investigation of the value of chloride of lime in the sterilisation of water has been published by OTTOLENGHI. River water was used, to which measured quantities of typhoid and other bacilli of the coli group were added. It was found that effective sterilization takes place if an excess of not less than 2 to 3 milligrammes of free chlorine is present per litre, after the lapse of 15 minutes. The determination of the amount of free chlorine present is made by the addition to each litre of water of 1 decigramme of a powder containing three parts of starch to one of crystallised potassium iodide. The colour produced should be of a deep violet-blue, which should not diminish on standing. If the colour is only purple and begins shortly to fade, less than the requisite amount of free chlorine is present. The quantity of chloride of lime which will yield 15 milligrammes of permanently free chlorine may be taken as being 45 milligrammes, on the average, and this is the quantity which should be added, as a rule, to each litre of the water to be sterilized. It is a good thing to clarify very turbid waters, as a preliminary, by the addition of 15 to 20 milligrammes of sulphate of alumina per litre, or the sulphate of alunina may be added along with the chloride of lime, as they do not react on one another. The clear liquid is then decanted or filtered, and will be forthwith fit to use as drinking water.

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\*OTTOLENGHI (D.). Ricerche sperimentali sulla purificazione dell'acqua per le truppe col cloruro di calce. [Experimental Researches on the Purification of Water for Troops by Means of Chloride of Lime.]—*Igiene Moderna*, 1916. Jan. Vol. 9. No. 1. 20 pp. [Summarised by J. B. NIAS.]

## SANITARY ORGANISATION.

## CAUSE AND EFFECT.

When the "Emden" fired a few shells into Madras city about 60,000 Indian inhabitants concluded this was but a foretaste of worse to come. They reckoned neither with the chivalrous conduct of the captain of the "Emden," in apparently attempting to confine himself to the devastation of petroleum tanks, nor with the fact that a "surprise" cannot well come off twice. The following result is recorded by the Health Officer\* :—

"The 'Emden' bombarded the city on the 23rd September, and the exodus from the city has probably to account for the decline in the births. We may compare the records of the previous years :—

Births for October and November :

1911.	1912.	1913.	1914.
3,681.	3,963.	3,577.	2,588.

The decrease of over a thousand births may, therefore, be attributed to the bombardment."

But not only did the "Emden" decrease the birth-rate of this city, but it added greatly to the death-rate by cholera. The Health Officer asserts that when the exodus took place (23rd September) cholera was prevalent in the taluqs neighbouring the city, and when the refugees returned they brought cholera with them. This epidemic caused 2,332 attacks. Not solely to that very able Health Officer, Dr. MACDONALD, but to the *amour propre* of his predecessors, it has always been apparent that Madras City is the innocent victim of the surrounding rural areas; and it is not surprising therefore that [p. 52] he puts the matter clearly before the reader :—

"With the city's dense population one would have expected the city to be a constant menace to the district, instead of the usual experience, the district being a danger to the city. The secret would seem to be in the fact that, imperfect as the city may be in many sanitary matters, it is yet much in advance of most mofussil villages. That may be regarded as an explanation of the city's danger from without."

Unfortunately, there is less evidence of the truth of this reasoning of cause and effect than in the case of the birth-rate and the "Emden's" shells. The portions of the following quotation from the Health Officer's Report [p. 52] which the writer has placed in italics show that the history is by no means so convincing as the argument used by the "Emden" :—

"Cholera was *officially* declared epidemic in the city in the week ending 15th August. *For some time previous to this date*, however, there were *scattered cases* returned from some divisions. When the city was *practically* free, cholera was raging in epidemic form in many parts of Chingleput District, the seizures at Conjeevaram being particularly heavy. But at an even earlier stage than then, cholera was in epidemic form in the villages near the Red Hill Lakes. *That was about the middle of July*. In August the usual Periapalayam Festival took place. Advertisements were inserted in the local press, warning intending pilgrims of the danger from cholera, and advising them not to attend. The usual annual precaution of patrolling the tollgates to check apparent cholera cases from entering the City, was in force during the whole Festival." [Italics not in original.]

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\*Report of the Health Officer, Corporation of Madras, Health Department for 1914. p. 41.

Granting, however, that the neighbouring district yielded to infection before the city, what did the Corporation do? The Health Officer reports that pilgrims were warned not to go to a certain festival and the tollgates were patrolled "to check apparent cases of cholera entering the city." But nothing is said as to action taken as to cholera "at an even earlier stage" being present "in epidemic form in the villages near the Red Hill Lakes." These lakes happen to be the impounding reservoirs of the Madras City water-supply. In 1882, a special Sanitary Officer [W. G. KING] was appointed by the Madras Government in reference to a cholera epidemic in the City of Madras. *Inter alia* he advised the removal of those villages, or other special sanitary methods, as an urgent necessity for Madras City. An estimate made at that time showed the cost involved would have been a really small total, but the municipality did not rise to the occasion. The matter was pressed in 1890, and in 1894 and 1905, by the same officer, as Sanitary Commissioner for Madras. By 1905, the value of the sites had risen ten times, showing that *early* action in protecting catchment areas is ordinarily in the direction of economy. The city of Madras should shortly have the protection of filtered water but, as the histories of Altona and the Lambeth Waterworks of London prove, something more than the existence of filters is necessary. Then, too, although the warning of pilgrims is worth the cash paid for advertisements, with 500,000 inhabitants at stake, it is more than likely the dreaded festival need not have contributed to the mortality of the city, had the Municipality and the District Board concerned pooled their resources and made combined efforts for an effective organisation. Cholera has never yet halted on one side of a toll-bar, in respect for the feelings of a corporation whose limits are coterminous with an infected district.

#### THE SANITARIAN AND FINANCE.

Dr. Malcolm WATSON concludes his interesting work "Rural Sanitation in the Tropics," reviewed in this number, with a reference to a sanitarian who in reply to a query "as to what was the cost of his proposal" stated: "When I give the order I don't bother about the cost." On this text, he cautions the sanitarian in the tropics that he must "cut his coat according to his cloth," and, using an extract from a Report on the "Economic conditions in Egypt," calls for pity for an administrator possessed for the first time of a surplus, and pestered by faddists oblivious of the total demands upon the public purse for railways, roads, bridges, increase of the army, education, hospitals, etc.

As to the case of the pseudo-sanitarian he cites, not only does he deserve the condemnation for contempt of finance which Dr. Malcolm Watson heaps upon him but, in the writer's opinion, still more so for the use of the word "order"; for nothing should be more clear in the sanitarian's mind than that (except in the case of subordinates placed at his disposal) he never *orders*—but advises. In any case, it is exceedingly unlikely that the sanitarian Dr. Malcolm Watson has called attention to is a type; at the utmost, he must be a freak with a distinct tendency to self-extinction. In the writer's opinion, the only point as to which an administrator deserves pity is that whilst the sanitarian's responsibility ends with advice, upon the former rests

the, at times, grave responsibility of action and, fortunately for the sanitarian, for the absence of action. It is by remembering these aspects of the matter, and in seeing that administrative and legal difficulties are duly allowed for in schemes he proposes that the sanitarian may best exhibit pity compatible with duty. The experienced administrator can always be relied upon to take care of the money bags and neither asks for nor deserves pity, and can ordinarily find a smile for the enthusiastic worker. If he be of the tactful variety, he may be depended upon to send all claimants away with the belief that if their particular fads cannot be satisfied in the present budget there are hopes that next year, etc., etc. "To cut the coat according to the cloth," as advised by Dr. Malcolm Watson, is of course a necessity, but it is still better that the sanitarian should attempt to get a reasonable amount of the total cloth. So long as heads of all spending Departments of Governments are sufficiently human to be inspired by the belief that, without the correct fulfilment of their particular function, the wheels of State cannot move smoothly, the sanitarian would be ill-advised not to make his voice heard in the crowd of applicants for funds, and that right lustily. He need not waste pity on the veteran administrator. On the opposite, he should stalk him systematically. For this purpose, he should acquire a fair knowledge of the total funds at disposal, and place his schemes for sanction in reasonably approximate detail as to cost, present and future—not forgetting possibilities of financial profit or saving. Further, his schemes should be launched in such manner and time as will prevent him receiving merely the crumbs from the financial table as an act of philanthropy—after all the other clamourers and faddists have been satisfied. It is worth remembering that, up to date, it is quite the exceptional administrator in the tropics who is capable of convincing himself that the improvement of health of a people (in the presence of successful government) results in an improvement of revenue. Sanitary matters are to the average official more allied to the Ecclesiastical Department of a State than that dealing with Industry and Commerce.

#### NIGHT-SOIL CONSERVANCY AND EDUCATION.

The inimical influence of ankylostomiasis upon the physical labour powers of populations is well verified, but although it might be anticipated that the mental powers of infected persons as an accompaniment of anaemia and general debility should likewise be handicapped, such theory has not been put to the test. Writing in the *U.S. Public Health Reports*, 1915, July 9th, p. 2067, Professor C. W. STILES shows from an examination of over 2,000 school children the extent to which these are infested with intestinal parasites, and, having ascertained the respective grades of educational efficiency, traces their sanitary history in respect to chances of faecal contamination following more or less imperfect conservancy of their homes. Homes where the privy system prevailed would certainly be more likely to offer chances of earth and fly-borne contamination than if sewered. Accordingly, he is able to quote figures proving that children in sewered homes advanced in education more rapidly than in those served by privies.

Whilst recognizing that other factors must come into consideration, he holds that

"it is, however, legitimate to invite attention to the fact that more cases of soil-pollution diseases are to be expected at privy homes (group P) than at sewered homes (group S), and therefore that more absence from school, with consequent retardation, because of these diseases, is to be expected among children from privy homes (group P) than among those from sewered homes (group S); the conclusion therefore seems justified that the privy, with its attendant dangers of disease, is one of the many factors involved in explaining the data submitted.

"If we study the cases of different intestinal parasitic infections that are spread through lack of proper disposal of human excreta, the conclusions seem justified that the cases of infection with *Endamoeba coli* and with *Lambliæ* do not present any evidence that these two parasites have had any effect in the retardations noted; the statistics for infections with *Ascaris lumbricoides* and with *Necator americanus*, however, tend to support the view that these two parasites are factors that must be considered as of practical importance (less for *Ascaris* than for *Necator*) in connection with retardation, even in cases of relatively light infection, as were most of the cases with which we had to deal; our data for infection with *Trichomonas*, *Oxyuris*, *Trichuris*, and *Hymenolepis nana* are not sufficient to warrant any deduction as respects these parasites."

So common is infection with *Ascaris lumbricoides* and *Oxyuris vermicularis* of school children in the southern parts of India, the writer suggests that were Professor Stiles' method pursued, an excellent case would be made out for a policy which would demand not that education should precede hygiene but that it should accompany it. Putting aside the influence of these parasites upon general nutrition, so intensely does the nervous system of the oriental child respond to intestinal irritation that the physician who attempts to combat abnormal temperatures in fevers and ignores their presence, courts defeat.

## SANITARY RULINGS.

## PROTECTION OF MILK PURITY IN FOUR INDIAN CITIES.

*Calcutta.*—In 1908–09, the Calcutta Municipality began to discuss seriously schemes for securing pure milk supplies for the city. The Health Officer of the period proposed Municipal Milk Depôts, the pasteurization and cooling of milk, model cow houses, municipal grazing and dairy farms. The discussion progressed excellently thereafter; but there is nothing to show that the milk supply has been improved in the interval. However, in the latter part of 1915, the question was referred to Captain WATSON, I.A., Assistant Director of Military Dairy Farm. His advice, which has been accepted by the Corporation,\* is thus recorded :—

“ Briefly Captain Watson’s recommendations are as follows :—(1) To obtain the necessary legal powers. (2) To establish markets in which all milk must be sold and where it will be subjected to proper examination. (3) To provide appliances for cleansing and pasteurising milk and to insist upon all milk sold being treated by this process. (4) To provide land at a distance from Calcutta to which the city *goolas* (milkmen) can go, and then take steps gradually to move them out of the city. (5) To arrange for the cheap transport of milk to Calcutta. (6) To establish a Municipal Dairy Farm as a model, and to assist and control the settlement of *goolas* in the country.”

This advice of 1915 is sound; but so also was that by the Health Officer of 1908, on the same lines.

*Bombay.*—According to the Annual Report of the Executive Health Officer, Bombay, for 1913–14 [p. 44] several amendments and additions to Byelaws as to milch cattle stables have been secured, in the matter of supervision and control of premises, ventilation and cleanliness of stables and surrounding spaces, and precaution as to infectious diseases, and provision has been made for licensing milk sellers and places where milk is sold. Suggestions have also been made by Dr. TURNER to secure that analysis for adulteration for milk shall be conducted by the Municipal Analyst; instead of by the Government Analyst as heretofore.

*Madras.*—Model cow-houses beyond the thickly inhabited parts of the city were under construction in 1914. Stringent measures are “ taken to prevent stabling of milch cattle in dwelling houses . . . 995 prosecutions were launched and 379 convictions were secured to enforce the terms of licences dealing with such places.” The Government of Madras made a grant of Rs.50,000 in aid of the Corporation’s efforts towards building model cow-houses.

*Rangoon.*—The following are measures adopted by the Municipality of Rangoon† :—

“ Briefly, the measures which it is proposed to take are (a) the prescription of bye-laws regulating the sanitary condition of dairies and places where milch animals are kept for profit, one of the bye-laws being that every owner of milch cattle kept for sale of their milk, and every occupier of a milch cattle stable where cattle are so kept, shall admit at all times the Health Officer or Veterinary Officer or other Officer appointed by the Committee for the purpose, to inspect the premises occupied by them and

\*Statesman (Calcutta), 17.9.15.

†Report on the Working of the Rangoon Municipality. 1914–15. p. 10.



the cattle therein for the purpose of carrying out the provisions of the bye-laws; (b) the establishment of a depôt where all imported milk shall be tested; (c) the prescription of bye-laws regulating the sale of milk within the limits of the Municipality. For the purpose of these bye-laws, standards are prescribed for milk that will be deemed to be "pure milk" and "watered milk," all vendors of milk must be licensed to sell pure or watered milk, as the case may be, and all watered milk shall be kept only in vessels labelled as containing watered milk. As regards imported milk the licence provides that the licensee shall not sell or expose for sale milk which has been obtained from a dairy situated outside Municipal limits unless such milk has passed through the Municipal depôt and various other conditions to ensure the same control over dairies situated outside Municipal limits as in the case of dairies situated within Municipal limits."

The idea of permitting "watered milk" has reference to the greater percentage of solids and fat in buffaloes' as compared with cows' milk. In the writer's opinion there are strong political and hygienic reasons why such a method should not be adopted by any public body, and particularly by one dealing largely with an Indian population.

#### THE UGANDA TOWNSHIP ORDINANCE.

In the *Uganda Official Gazette* of the 31st January, 1916, is published new "Township Rules" under the above Ordinance. Many of these are elaborate and of a well conceived character, and must mark a vast advance in Communal Government in the area concerned, more especially in respect to structure of dwellings. Of rules of direct sanitary importance, the following are of interest:—

*Rule 22.* No well shall be dug "without written permission," and it shall be provided with a masonry steining and closely fitting cover.

*Rule 23.* Any collection of water or liquid containing mosquito eggs, larvae or pupae, is a nuisance to be summarily dealt with.

*Rule 24.* Water may not be stored unless effectively screened or kept covered with a film of kerosene oil.

*Rule 25.* "(1) The occupier, or, if there is no occupier, the owner of any premises shall:—

"(a) Keep such premises free from stagnant water; and

"(b) Keep such premises free from bottles, tins and other articles which may retain water and from all plants or vegetations which are known to retain collections of water, suitable for the breeding of mosquitoes, or favour by their nature or position the breeding of mosquitoes.

"(2) The presence of mosquito larvae or pupae in any collection of water shall be sufficient evidence that such water is stagnant."

*Rule 26.* The occupier or owner of premises is required to cause all cesspools and cesspits in such premises to be "oiled" and all catchpits to be cleaned once weekly.

*Rule 27.* "The occupier or, if there is no occupier, the owner of any premises shall maintain all drains, culverts, drainpipes and guttering on such premises in good order and repair and free from obstruction and in such a manner that water cannot accumulate therein."

*Rule 28.* "The occupier, or, if there is no occupier, the owner of any premises shall cause all ponds, pools, or excavations which may contain stagnant water on such premises to be filled in or drained or kept covered with a film of kerosene oil."

*Rule 29.* Building material may be obtained by digging from spots approved by the Township Authority. But, "Such permit shall be subject to the condition that the person digging shall cause all holes dug by him which may contain stagnant water to be filled in, drained or covered with a film of kerosene oil, and such other conditions as the Township Authority may think fit to impose."

**Rule 30.** "All projects for drainage or irrigation or for the plantation of areas or watersides shall be submitted to the Township Authority for approval, and shall not be carried out without such approval in writing."

The following is the form of notice requiring abatement of mosquito nuisance:—

"Form of Notice requiring Abatement of Mosquito Nuisance.

"UGANDA PROTECTORATE, TOWNSHIP OF—

"To (person causing the nuisance or owner or occupier of the premises at which the nuisance exists, as the case may be).

"Take notice that, under the provisions of the Township Rules, 1916, the Township Authority being satisfied of the existence at (*describe premises where the nuisance exists*) of mosquito larvae breeding in (*describe the place; for instance a well, barrel, excavation, or cesspit*) or of conditions which are favourable to the breeding of mosquitoes, insects, or parasites (*describe the condition, for instance, broken bottles on walls or an improperly constructed surface drain, or an unscreened tank*) does hereby require you within (*here specify the time*) from the service of this notice to abate the same, and for that purpose to (*specify any works to be executed; for instance, fill up excavation, oil cesspit twice a week, etc.*) (and the said Township Authority does hereby require you within (*here specify time*) to do what is necessary for preventing the recurrence of the nuisance and for that purpose to (*specify any works to be executed*).

Dated this	day of	191
Signature of Executive Officer of Township Authority	}	."

**NOTE.**—*Rule 22* provides a power of an unusual character, in not apparently requiring the Township Authority to assign a reason for electing to fill in a well. No difference is apparently contemplated between public and private wells.

Under Rules 23–25 (2) action must often be deferred, owing to it not being proved that water likely to favour mosquito propagation contains eggs, etc. If legal quibbles are feared as to definition of stagnant water, it should be possible to define stagnation for the purpose of this Rule by the absence of a rate of flow known to be inimical for mosquito propagation. Again, under *Rule 28*, instead of it being necessary to wait till an excavation "may contain stagnant water," a minimum gradient to secure removal of surface water from premises might be enforced in each case as prescribed by the Authority. An additional power of this character would be advantageous.

*Rule 26*, contrary to the mode used in the remaining Rules *ad hoc*, employs the word "oiled" without requiring a "film," and without stating the nature of the oil to be used. *Rule 29* may not secure the object in view, owing to the somewhat loose use of the proviso "which may contain stagnant water." It is evident from the use of the clause "or covered with a film of kerosine oil" in *Rule 29*, that both here and in *Rule 28* by the phrase "may contain stagnant water," no condemnation of the shape, size or position of any surface depression is contemplated, on the ground that at some future time (e.g. after rainfall) there is risk that water in a stagnant condition may be found within it, but that no condemnation can occur unless stagnant water is a present condition—a "wait and see" policy. These particular Rules in the caution exhibited are in considerable contrast to *Rule 22* and those concerning syphilis. This Rule would not meet the condition that during excavation holes should be so shaped or drained as not to allow of retention of water. *Rule 30* is an excellent provision and should prove of much value in malaria prevention.

In regard to disposal of night soil, power is taken to require the owner to make such arrangements as the Township Authority thinks fit, "or it may itself provide for the removal and disposal of night soil;" but this Rule fails to provide power to recover cost of such proceedings from the occupier or owner of a house.

In the matter of syphilis, the Rules are of a most stringent character and rest for their success upon *vis a tergo*. If this suffices and is politically suitable much good must result.

#### FACTORIES.

In the Madras Presidency, the people are beginning to appreciate the importance of development of industries, with the result that factories supplied with modern machinery are becoming more in evidence than formerly in District Municipalities. Timely legal measures to secure their orderly and hygienic management have therefore become necessary, irrespective of powers already possessed by the bodies concerned to control "Dangerous and Offensive Trades." An amendment of the Madras District Municipalities Act of 1884 is therefore before the Legislative Council of the Local Government. The Amendment provides that:—

"If in any existing factories any nuisance is likely to be caused by the particular kind of fuel employed or by excessive noise or vibration, the council should be empowered to give directions for the abatement of the nuisance in the first instance. If the nuisance is not abated within the time prescribed, or if the abatement is found to be impracticable, the council is empowered to restrict the hours of working and restrict the kind of fuel that may be employed for working the factory or mill. . . . Several provisions have been introduced for the purpose of safeguarding the rights of persons who are owners of mills, or who intend to put up mills, against any possible oppressive use of their powers by the municipalities." It has been "provided that if a municipal council does not pass orders on an application for permission to construct a factory within three months after the receipt of the application, the application should be deemed to have been sanctioned; . . . also that if any individual should think that the municipal council has been exercising its powers in an arbitrary or oppressive manner, he can apply to Government for revision."

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## TREATMENT OF WASTE.

## THE ECONOMICS OF CONSERVANCY.

## COLLECTION OF EXCRETA.

At page 476, Vol. 5, of this *Bulletin* [Sanitation Number] the writer referred to the fact that the amount of urine largely decides the weight and bulk of the total excreta of a population. When dealing with certain tropical races employing water for ablution, as against the various less decided modes of cleansing after defaecation ordinarily selected by occidental nations, the matter of bulk of fluid to be dealt with becomes still more serious.

It is well recognised that ammonical decomposition is less likely to be evident if faecal matter be collected without urine or added water. It also should be definitely recognised that it is not just to insist upon the poorer classes of a population in the tropics resorting to public latrines that are not as free of offence to the senses of smell and sight as reasonable expenditure can secure. In the absence of this effort, the preference for a cleanly space on mother earth and the sky for a roof is not surprising. So long as a population is not able to afford a sewerage system, the possibility of adopting a separation system must, therefore, be of interest to the sanitary officer concerned.

Numerous forms of latrines have been devised for separating the urine from the faeces, but the designers ordinarily carry the problem no further. They leave the same mass of faeces and urine to be removed by separate modes of transport, and thus, probably, add to cost by more expensive plant and staff not only for collection but for transport.

In this *Bulletin*, Vol. 4, p. 461, it was shown how simple forms of aerobic filter pit latrines, devised by the writer, could be employed to fulfil requirements of the separate system. Diagrams annexed show other forms of latrines for the same purpose designed by him, which also fulfil the requirements of separation of urine and faeces. Lt.-Col. WILLIAMS, Sanitary Commissioner for Burma, has advised their use in that country, and has stated officially his preference of them to certain well known iron latrines on the market. They are in practice necessarily not so devoid of odour as filter pit latrines. They could of course when adapted to private houses, institutions, or small towns be better worked by placing in the pans for receipt of faeces dry earth, ashes, sawdust, or paddy husk; but in public use such additions, especially dry earth, add greatly to cost, by increasing bulk and weight of material to be carried. Quick removal and retention in special covered receptacles, close to the latrines, of faeces pending transport in that case must be practised. When water is used for ablution\* it would be necessary to add an additional compartment at the head of the drain, which should not be provided with a pan. Here water should be supplied by tap served by a covered cistern or barrel external to the latrine. The water used for ablution thus helps to flush the drains.

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\*Burmans use sticks.

Fig. 1 shows an ovoid, cement lined, or salt-glazed stoneware, drain, such as used for surface drainage. The drain is divided by screens into lengths purposely offering no more space than absolutely requisite for average individuals; the object being to limit defilement of surfaces. For the same reason footpaths are restricted in size. On the curb of the drain, a receptacle is placed, as per plan. The breadth of the drain allows a squatting position of 9 inches from heel to heel. The slope of the foot rest is such as to ensure that the user squats *à la Turque* in the required position, so that the faeces pass to the pans and the urine to the drain. In construction, care must be taken to see that the exact position of the foot rest, in respect to the front and rear screens, is obtained. *Haphazard measurements of the foot rest, its grade of slope and position will abort the whole purpose of the latrine.*

Figs. 2 and 3 for public and private latrines, respectively, are on the same principle but represent a grade higher in civilisation, as urine does not pass into the drain common to all squatters.

In all cases, if the latrine is situated so that the drainage cone of wells is not endangered, the urine may be received in pit filters immediately outside the latrine or, if on crowded areas, into cement-lined cesspools from which, by a small hand pump attached to an iron cylinder cart, or by vacuum carts, it can be lifted for transport.

Where the use of filter pits is feasible, there is no further trouble as to the urine, as the filtrate disappears by lateral percolation in the subsoil, except that precaution against flies should be taken, either by petroleum sprinkling or wire gauze covering. They should be protected by acute sloped covers guarded by wire gauze. When cesspools for temporary receipt of urine are employed, similar precautions should be taken.

Figs. 1, 2, and 3 get over the difficulty of making a raised platform for receipt of excreta into buckets placed below as commonly employed, and this method is cheap in execution.

Fig. 4 shows a reinforced concrete latrine designed by the writer in 1906, which is faced with glazed stoneware in parts touched by urine.\*

When it can be afforded all other parts should be covered with white glazed tiles set and pointed in cement. The platform can be raised on supports (see diagram) for use with a bucket, or this can be dispensed with and a pan be used as in the other latrine. In this latter form, it can be adapted for use either with the separation or water carriage system in hospitals for races using the squatting attitude. Although shown as a single platform, the pattern can, with economy, be employed for any number of continuous seats,\* separated by partitions, for public latrines. For small institutions, there is no difficulty in adding hoppers so as to imitate the usual arrangement for dry earth

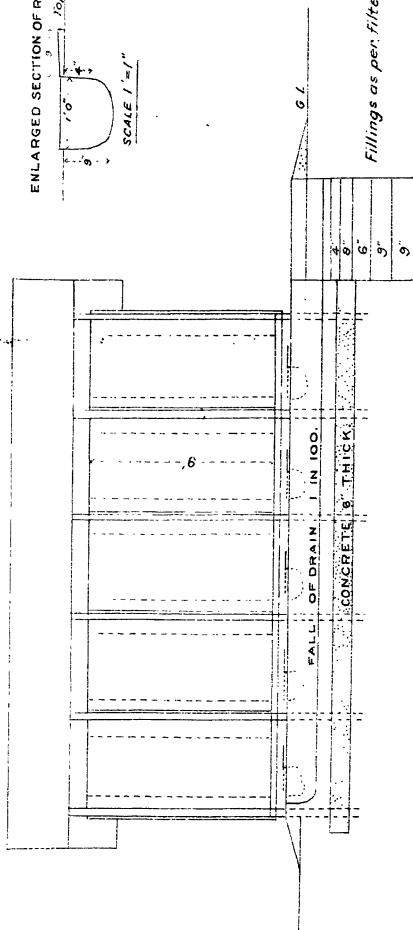
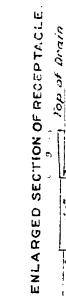
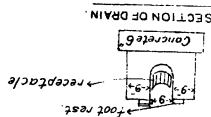
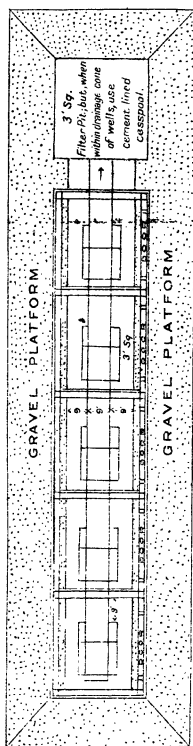
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\*This form of latrine is of special advantage where the cost of transport is great or risk of rough treatment likely. In this case the transport of casks of cement and iron rods for reinforcement, is a much simpler matter than in the case of iron latrines or platforms. It is very difficult to construct cheaply *complete* glazed stoneware latrine platforms, and equally difficult to transport them without breakage. Further, if the drain is to be all in one piece with the body, elaborate work would be necessary to secure a series of seats with a continuous drain of a desired gradient. Hence, the advantage of the glazed stoneware being continuous only where in contact with urine.

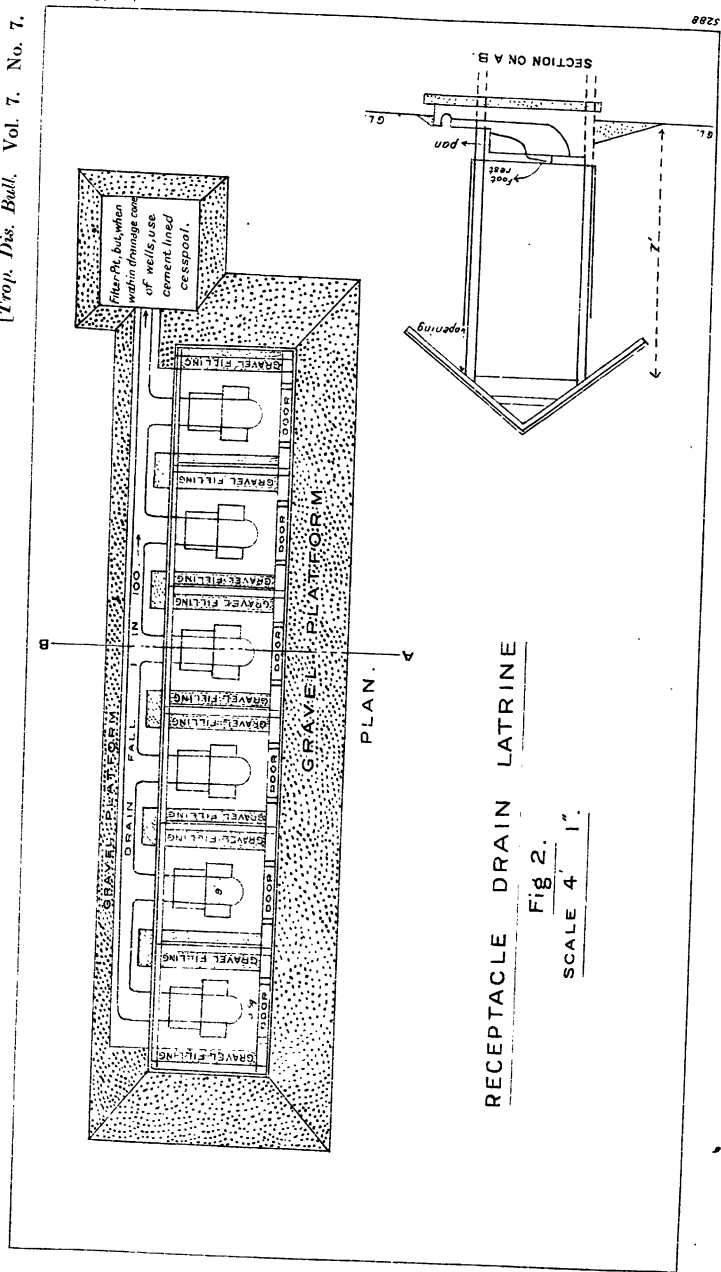


# RECEPTACLE DRAIN LATRINE. FIG. 1.

SCALE 4' = 1"



Fillings as per filter pit.



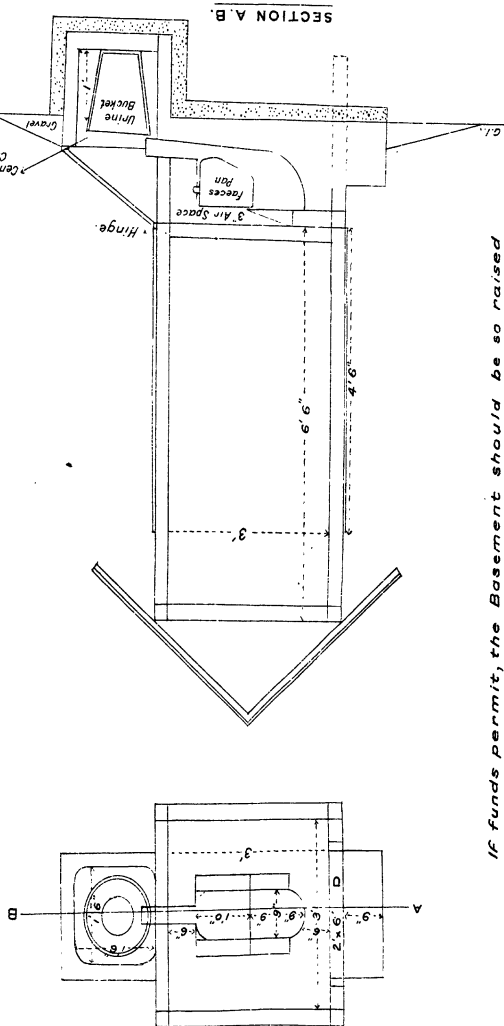
RECEPTACLE DRAIN LATRINE

Fig 2.  
SCALE 4' 1"



# SEPARATE SYSTEM PRIVATE LATRINE.

Fig 3.  
SCALE 1/12

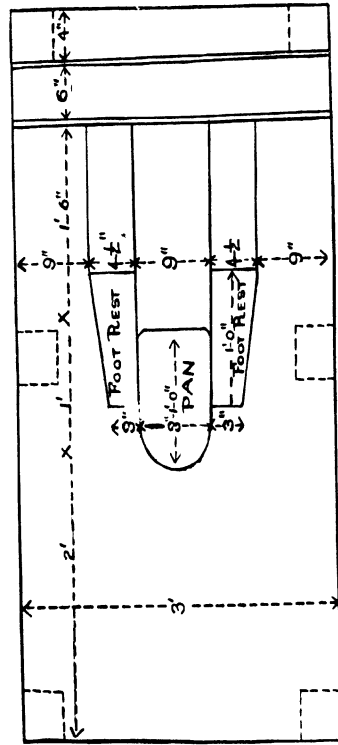


*If funds permit, the Basement should be so raised that the Urine Bucket rests on a Concrete Platform which will be flush with G.L.*

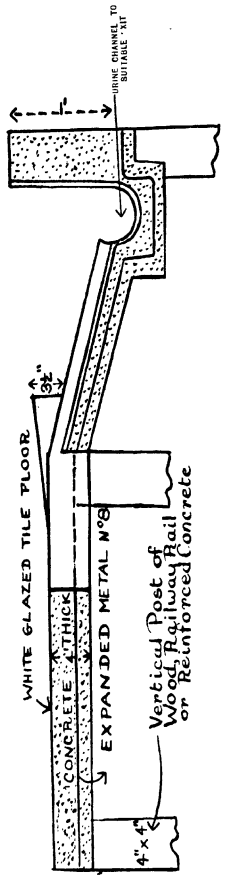
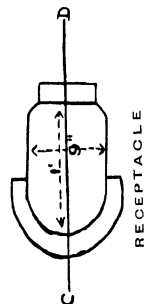
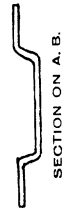
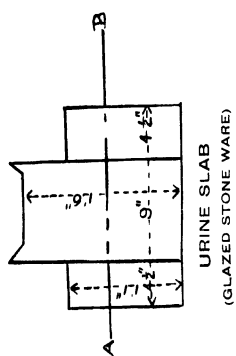
# RE-INFORCED CONCRETE LATRINE

Fig. 4.

SCALE = 1 1/2"



PLAN



SECTION

Fig. 1 shows an ovoid, cement lined, or salt-glazed stoneware, drain, such as used for surface drainage. The drain is divided by screens into lengths purposely offering no more space than absolutely requisite for average individuals; the object being to limit defilement of surfaces. For the same reason footpaths are restricted in size. On the curb of the drain, a receptacle is placed, as per plan. The breadth of the drain allows a squatting position of 9 inches from heel to heel. The slope of the foot rest is such as to ensure that the user squats *à la Turque* in the required position, so that the faeces pass to the pans and the urine to the drain. In construction, care must be taken to see that the exact position of the foot rest, in respect to the front and rear screens, is obtained. *Haphazard measurements of the foot rest, its grade of slope and position will abort the whole purpose of the latrine.*

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closets. Here, instead of employing separate buckets or pans, the faeces can be received into a trough on wheels containing dry earth. The trough can thus be dragged to the place of deposit of night soil to the saving of labour and plant.

The whole of these latrines should by means of wire mesh (11 wires to the mesh) be rendered fly-proof.

#### THE ECONOMY OF WASTE.

The Madras City Corporation Report for 1914 shows that a sum of Rs.37,438 was realized from contracts for grass on the chief sewage farm. The area placed under broad irrigation with sewage was originally a bare sea-sand waste.

Open earthen channels which were tried experimentally for the conveyance of sewage in place of the semi-circular cement pipes in use, have been found to work most satisfactorily. The cement pipes in the farm are being gradually removed, and replaced by earthen channels, and this is specially noticeable in the portions of the farm improved during the year.

On account of sale of rubbish, the sum of Rs.16,957 was realized.

In the Cairo sewerage scheme recently completed, sewage irrigation of 3,000 acres of desert land is provided for.

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## SANITARY WORKS.

## IRRIGATION AND MALARIA.

It is no new matter for it to be recognised that the actual irrigation of a field is not the great factor in placing water at disposal for mosquito breeding, but the failure to provide for its prompt removal after it has done its duty and that of waste water from the supplying canals or distributing channels. In dealing with the main canals, the amount of waste by seepage depends greatly upon whether or not the water is carried at or below ground level. The latter condition has been aimed at in more modern constructions, with the hope of minimising subsoil and surface water-logging; often at greatly increased expenditure and loss of head. But, even when these are faced, much depends on the nature of the subsoil. Thus, in the Kurnool District of the Madras Presidency, where laminated limestone rock predominates, water from the Kurnool-Cuddapah Canal may be found, in many parts of its course, permeating the interstices of rock several hundred yards distant from the main canal (which is duly sunk below the ground level) with the result of water-logging of the soil at lower levels, and the usual train of malaria.

To prevent seepage from main canals and from their distributing channels is desirable, not only as an anti-malarial measure but for securing economy of water. This economy in a period of drought with famine threatening the land may be of vast public importance as a life-saving measure; whilst, at times, it must imply the power of extension of the benefits of irrigation to the agriculturist with an accompanying increase of revenue. At p. 570 of Vol. 6 of this *Bulletin* [Sanitation Number], the question of water-proofing was referred to as a matter that was, in India, still in the preliminary stage of suggestion, although the subject had been advocated, according to *Indian Engineering* (which the writer quoted) as far back as 1903.

Fortunately, in America, the matter has gone beyond the mere "talk stage," and there are at disposal according to the *Engineering Record* (New York) of April 15, 1916 [p. 508], enough data as to water-proofing and its results to show that the method is not only sound theoretically but is successful in practice. The following is an extract from the paper:—

"As a result of lining with concrete about 40 per cent. of the canal and lateral system of the Okanogan irrigation project in Washington seepage losses have been reduced from 51 to about 15 per cent. of the total water received from Salmon Creek at the headworks, and an insurance against water shortage during seasons of minimum runoff has been provided. The lining has been placed in the sections of the canals where seepage losses were greatest, these locations having first been determined by current meter measurement. . . .

"The losses in the canal system for 1911, with 43 miles of canals and laterals in operation and only one mile concrete lined, was 51·1 per cent., an average of 1·2 per cent. per mile of canals operated. The loss for 1915 was 20·4 per cent, with 76 miles of canals and laterals operated and 21 miles concrete lined, or an average of 0·27 per cent. per mile of canal operated. Three small laterals carrying from 5 to 15 sec.-ft. have been all concrete lined.

These laterals are from  $\frac{1}{2}$  to  $1\frac{1}{2}$  miles long, and a careful checking of the weir measurements of all the water turned in and turned out shows that there is practically no loss at all in these canals. About four miles of lining have been placed since the close of the 1915 irrigation season and another  $1\frac{1}{2}$  miles will be lined before the season for 1916 opens. It is estimated that this will reduce the losses in the system to less than 15 per cent. for the season of 1916. The capacity of the canals concrete lined has varied from 1 cubic foot per second up to 140 cubic feet per second."

In a further article on this subject the "Engineering Record" of the 22nd April 1916 [540] enters into the whole question of cost and mode of construction. Without touching details which have only professional engineering interest, some rough idea of cost and stability of work can be secured from the following extracts. As to gravel employed it is stated :—

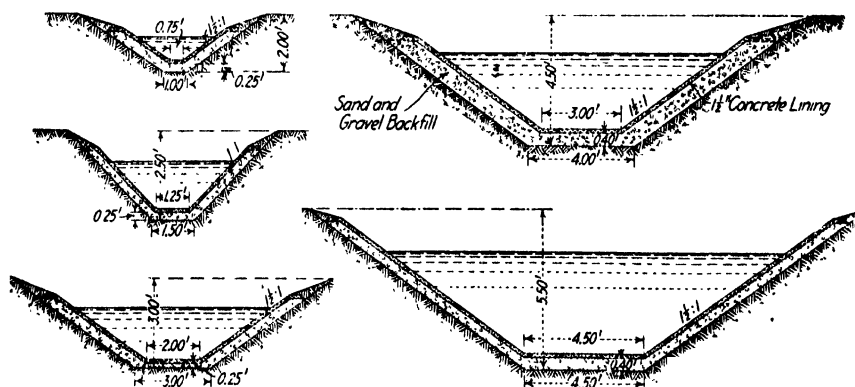
"Everything larger than would pass through a 1-in. mesh screen was taken out. The material, therefore, contained an extra amount of sand, but this was desirable in order to make the concrete easier to plaster and get an impervious surface. Frequent tests were made for the amount of voids in the aggregate, and the amount of cement was varied accordingly. A minimum of five sacks per cubic yard was used and a maximum of six sacks per cubic yard was sometimes required and used. The average for all the work was 5.2 sacks for each cubic yard of concrete placed."

The following statement will aid the sanitarian in calming the conscientious objector to expenditure in water-proofing channels on the ground of cost of upkeep and unsatisfactory wear, especially when exposed to sun action :—

"Part of the lining has been in use for four seasons and has given good service and shows no signs of wear. Up to date it has required no expense for maintenance, except at a few places on some of the first work. . . .

"No trouble has been experienced on account of expansion or contraction injuring the lining, even when the water is rotated and the canal is dry half the time during the summer. In general, the lining has proved very satisfactory and the indications are that it will give good service."

The annexed plans show the section of channels and lining adopted :—



Cross-Sections of Lined Canals.

## INFLUENCE OF ANTI-MALARIAL WORKS.

The following abridged Table from p. 126, Straits Settlement Medical Report for 1914, is significant of influence of anti-malarial measures in Singapore :—

TABLE A.

Schools.	1911.		October, 1914.	
	Pupils seen.	Percentage with spleen.	Pupils seen.	Percentage with spleen.
Kampong Glam .. ..	274	12·4	264	1·5
Rochore .. ..	143	18·8	120	1·6
Kallang .. ..	69	4·3	92	2·1
Kampong Rokok .. ..	51	3·9	39	..
Upper Tanglin .. ..	45	11·1	58	6·8
Lower Tanglin .. ..	67	5·9	66	1·5
Sepoy Lines .. ..	46	15·2	42	2·3
Telok Blangah .. ..	39	46·1	49	8·1
Kampong Jagoh .. ..	44	29·5	46	6·5
Anglo-Chinese .. ..	484	3·0	548	2·5
St. Andrew's Missions .. ..	..	..	431	1·1

In the Settlements, during 1912, the admission to Hospitals for malaria were 9,172 with 660 deaths; in 1913, the admissions were 8,102 with 499 deaths; and in 1914, 8,129 with 528 deaths. The whole of these cases were diagnosed microscopically.

The Government Pathologist, at p. 111 of the Report, states :—

“The proportion of deaths from malaria as revealed by post-mortem examination is a little lower than last year and much lower than in former years.

Tan Tock Seng's Hospital Mortuary.

Year.	No. of P.Ms.	Deaths due to Malaria.
1907 .. ..	1,083	212
1908 .. ..	1,472	372
1909 .. ..	1,278	241
1910 .. ..	1,403	314
1911 .. ..	1,743	434
1912 .. ..	1,422	216
1913 .. ..	1,010	105
1914 .. ..	1,050	90

“If we compare the malaria deaths in 1907 with those in 1914, when the number of post-mortem examinations is practically the same we see that there is a marked improvement. The number of cases admitted in a comatose condition is much diminished.”

## DOUBLE DOMESTIC WATER SUPPLIES.

The danger of using two sources of water supply for domestic purposes is well recognised. Equally the evil result of passing through the pipes of a public water supply system, temporarily, water from a source of inferior quality (such as may occur in stress of fire demands,

or in the breakdown of filters following floods or other causes) has been demonstrated from time to time. The Director of Sanitation, Minnesota State Board of Health, has been able to place on record\* an instance of temporary passage of untreated river water in a domestic water supply system, which is of interest not only in demonstrating this recognised danger, but in showing that, in the presence of much modern evidence of dysentery being fly-borne, the older theory of its water-borne origin should not be forgotten. He reports:—

“On October 24th, 1914, an outbreak of dysentery among the employees of the St. Paul Union Stockyards Company at South St. Paul, Minn., was reported by the Live Stock Exchange Company to the Minnesota State Board of Health. Investigation showed that about 80 of these employees developed symptoms of dysentery between October 21st and 24th, the majority of them on the night of October 21st. It also brought out the fact that all these persons were using water from the distribution system of the St. Paul Union Stockyards Company. The regular water supply of this company was pumped from three drilled wells. . . . For fire protection there exists a system of mains supplied with water pumped from the Mississippi River through an intake. . . . It was discovered during the investigation that Swift and Company had furnished water to the Union Stock Yards system on October 19th and 20th, at which time Mississippi river water doubtless had entered the Union Stock Yards system as described above.”

Analysis showed contamination of the river supply but not of the well supply. The connecting pipes of the double supply were removed and, lest typhoid infection of the sufferers might also be involved, anti-typhoid inoculation was pursued.

### FLOORS.

The use of reinforced concrete floors has decided advantage in buildings, public or private, within the tropics. It is rarely, however, this method is adopted for any but the larger class of buildings. According to the *Indian and Eastern Engineer* (Calcutta) for May 1915, the Indian Concrete Company (Messrs. Octavius Steele & Co., Managers) have introduced a form which should give an impetus to the employment of this character of floor in a class of buildings less pretentious. It is thus described:—

“The system consists primarily of a series of hollow reinforced concrete tubes of such a shape that when placed side by side continuous channels are formed between them. In the channels so formed the main reinforcement is placed, and the channels are then filled with concrete consisting of a mixture of 1 cement, 2 sand, and 4 aggregate, carefully worked in by hand. In one continuous operation a top layer of artificial stone is laid over the whole surface, and thus the tubes, the sides of which are suitably keyed, the ribs and the top layer form a monolithic slab which is continuous over the whole floor. As the tubes are placed against each other in such a way that continuous channels are formed, the main reinforcement is also continuous over the whole length of the floor, without any break whatever, and by varying the amount of the reinforcement the floors can be constructed to take different loads with the same tubes. The reinforcement employed consists of mild steel rods varying from  $\frac{1}{8}$  inch to 1 inch according to space. . . . On the matter of cost, the tubular floor can compete favourably with a usual tile floor in small rooms, and in rooms of larger size considerable saving can be effected; facts which constitute a very noteworthy recommendation of the system.”



## IRRIGATION AND DRAINAGE.

The Director of Public Works, British Guiana, in his Report for 1915 [pp. 19-20] gives expression to that intimate relation of irrigation and drainage, which is to the sanitarian of anti-malarial interest. He states:—

“I am of opinion that all works, both of drainage and irrigation . . . must nearly always go hand-in-hand. . . . Personally, I am of opinion that drainage is a more important matter than irrigation in this Colony and as so many lands are badly developed, or left waste owing to poor and insufficient drainage, I would suggest that the drainage of all such lands be examined and reported on. Probably when the financial situation is better, these lands in need of improved drainage could be dealt with. Also, in the case of new works in the Colony, such as roads, etc., drainage is a vital question and no scheme should be proceeded with until the drainage part of the scheme is worked out and the drainage required should be carried out as part of the scheme.

“It would be advisable also, in the cases of all Village, Sanitary and Country Districts, that the drainage system of these places should be under control, as to keeping it in efficient order, and that certain fixed sizes of sluices and drains be adhered to. At present there appears to be no system as regards these essential details. Sluices and drains are put down by the Chairmen of various districts, and the sizes of same appear to be regulated— not by the drainage area—but apparently by the amount of money available. Cases exist where drainage work has been carried out and it has proved to be inefficient.”

## RURAL WATER SUPPLIES IN THE TROPICS.

The vast influence for good of protected water supplies for rural populations needs no argument. Data for such supplies are rarely available, the time of engineers in tropical areas usually being occupied with more ambitious schemes. The following details supplied by *Indian Engineering*\* convey at once possibilities of simple methods of utility and, in the writer's opinion, reasons for modified complaisance :

“Simple in design and execution and perhaps simpler in its operation and maintenance, the installation represents an attempt to adapt, at a reasonable cost, the main features of an urban model to the needs and conditions of a rural population. The Kaniyambadi Installation consists of a protected well, a hand-pumping plant, an overhead reservoir, and a pipe line serving a number of fountains disposed in convenient situations in the village. The protected well is of the ordinary rural type, 10 feet in diameter and sunk to a depth of 30 feet below ground level, and 10 feet below summer water level. The pumping plant consists of a double-barrelled kite motion pump worked by hand, capable of delivering about 800 gallons per hour against a maximum total head of 461 feet. The working power required at full load, allowing liberally for frictional losses, is about three man-power at the handles. The overhead reservoir consists of a cement-lined covered masonry cistern capable of holding 2,000 gallons. The bottom of the reservoir is 11 feet above the ground. The actual reservoir capacity required is estimated at 1,440 gallons. The pipe line consists of 2½ inches cast-iron piping about 1,450 feet long. It is designed to discharge 6,400 gallons in six hours for a population, allowing for an increase, of about 3,200, which means 2 gallons per head. The quantity allowed per head is found by general experience elsewhere to be sufficient to meet the drinking water requirements of the general community. The supply will be drawn off by the people at five fountains so located as to be easily accessible from all parts of the village.”

\* Calcutta, 1916. April 29, p. 252.

For the unstated expenditure, there has resulted a supply to the people of two gallons per head of a presumably safe water supply. But this amount necessarily will not supply all the requirements of even a rural population and consequently, existing supplies, which normally are open to contamination, must continue to be the source to a large extent. The same vessels will be used by the people for drawing supplies from both the pure and impure sources, and water for washing domestic utensils and for mouth cleansing (an invariable part of the morning toilette of the Indian) need not be from the pure supply, with the usual consequence of the spread of water-borne disease.

Under these circumstances, it becomes a question as to whether a water supply on these principles justifies its cost.

In the case cited, it may be that the yield of the particular well utilized was the determining factor of possibilities, and that there existed no reason to place better lifting power at disposal. But if the total amount of water available is ample, it is more probable that the decision to use man power for the pump was reached in the belief that engine power was unsuitable for a small population of 6,000, especially with regard to the total of first outlay, and repairs being more difficult than in dealing with a kite motion pump. In arriving at such conclusions, however, the cost of wages of three men for man power would have to be balanced against the pay of a single man capable of driving a kerosene oil engine. This would imply in rural areas, in the part of India concerned, the pay of one reasonably skilled man, at an increased cost of 45 per cent. over the wage of one common labourer. This would leave a balance from the wages of two men towards kerosene oil at, say, 2 pints per working hour. Again, the difference between the cost of the kite motion pump and the kerosene oil engine might be an increase of about 32 per cent. on this one item. If efficiency be regarded, the difference in original outlay and working cost might well be justified. For example, at an expenditure of 2 pints kerosene per hour with an engine costing (in England) £68, there could be lifted 2,000 gallons per hour against a little over half that amount by man-power—provided none of the three coolies takes a siesta [see this *Bulletin*, Vol. 6, No. 5 (Sanitation Number), p. 283].

There must, of course, be a point at which the sanitarian, in the presence of small funds at disposal of a local body, must admit that the provision of at least one source of protected water supply is much better than nothing, but before this sanitarily incomplete arrangement is accepted, in each case, it is well worth while ascertaining whether a small extra initial outlay would not raise a water supply scheme from the status of a mere *placebo* to that of an active factor in sanitation.

In Applied Hygiene if the full equivalent in life saving value of money spent by a public body is to be realized, no "good enough" policy is economical. Under the strain of an epidemic disease, it becomes apparent that the strength of the chain is measured by its weakest link. Manu probably held much the same view in regard to sanitary policy, when he stated "Though the fruit of the kataka tree (presumably *Strychnos potatorum*) makes water clear, yet (the latter) does not become limpid in consequence of the mention of the fruit's name."

## LANDS AND BUILDINGS.

## TOWN PLANNING IN BURMA.

The following rules suggested by the Sanitary Engineer, after consultation with the Sanitary Commissioner for Burma, are of a useful and suggestive character :—

*“Area of house-sites.”*—The fixing of these dimensions involves very important issues. If made too small the result is usually the over-crowding of the site with buildings at a future date. If too large, and with restrictions as to the area to be covered with buildings the upkeep of the unbuilt-upon area is too heavy a tax upon the householder, and sanitation is hampered.

“In Rangoon the sites, which are 60 feet in depth, appear to me to be amply deep enough for the requirements of a town dwelling to be occupied by all but the wealthiest classes, or large firms. The depth of any main building upon such a site should be restricted to 40 feet, thus leaving a yard 20 feet in depth for the use of the occupants, and for the provision of wide space, in addition to the 16-foot drainage space, for the movement of air at the back of the buildings. In a non-sewered town this space admits of placing a privy at a sufficient distance from the dwelling rooms and kitchens, and close to the conservancy lane.

“With a house depth of a maximum 40 feet perflation of air through all the rooms will not be difficult to arrange for.

“The correct minimum frontage to be given to a site is a matter of the greatest importance. There is a strong tendency on the part of site owners to subdivide the frontage so as to provide additional tenements for sale or rental. In Rangoon the frontages are usually 30 feet in the old parts of the town where there is no restriction against buildings over the whole site. This has been found to be too narrow for two separate tenements unless these are divided by only a thin party wall. When two separate buildings are erected on such a frontage each can have an interior width of little more than 10 feet, the depth varying from 40 feet to 60 feet, while a narrow space, which quickly fills with refuse and is difficult or impossible to clean, is left between the two buildings, and between each of them and its neighbour on the adjacent lot. If a masonry building is erected on 30-foot frontage an attempt is usually made to convert it into three separate tenements, in spite of the rule which fixes the minimum width of a habitable room at 10 feet. This width cannot be attained for each of the rooms when there are two outside walls and two partition walls of masonry in the structure, but Municipal Committees are easily persuaded to suspend the rule in such cases.

“If the excellent rule for the provision of a space of 10 feet between the walls of adjacent houses be adopted, then a sufficiently convenient dwelling can be provided on the sites proposed having 30-foot frontage and 40 feet of depth. When it is desired to build a larger and more commodious dwelling two contiguous lots should be taken up for the purpose. In the business part of a town, which will be near to or around the public market, larger house-sites may be provided, with all necessary restrictions incorporated in the lease or in the Municipal Bye-laws to limit the area to be covered by buildings.

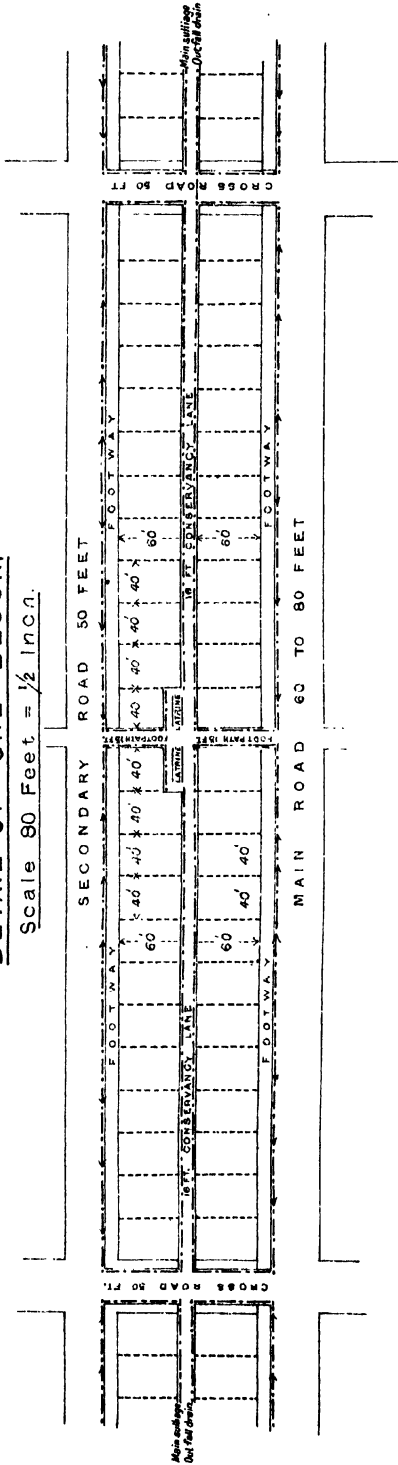
*“Length of block frontages.”*—The length suggested by the Sanitary Engineer, *viz.*, a maximum of 972 feet, is based on the length of the blocks in the *pakka* area of Rangoon. I am inclined to consider this length of frontage too great, even with the provision of a footway through the middle of each block. Probably a frontage of 655 feet maximum would be more generally convenient from the point of view of users of wheeled transport. This would give a frontage of 320 feet on either side of the central footways, and allow of eight house-sites on each side of the footway. There would then be sixteen houses to each public latrine of, say, six to ten seats, or a population of, say, 160 persons, of whom perhaps 60 would be provided with latrines in their own compounds.”

[Signed] C. E. WILLIAMS, M.D., D.P.H., *Lieut.-Col., I.M.S.,*  
Sanitary Commissioner, Burma.

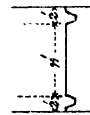
# PROPOSED LAY OUT FOR A TYPE BLOCK.

## DETAIL OF ONE BLOCK.

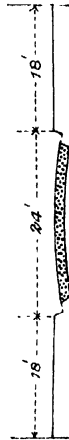
Scale 80 Feet =  $\frac{1}{2}$  inch.



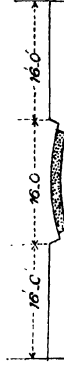
## CROSS SECTION OF FOOTWAY.



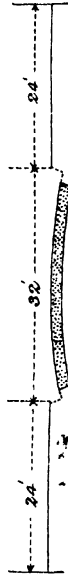
## CROSS SECTION OF 60' ROAD.



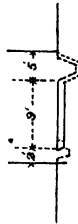
## CROSS SECTION OF 50' ROAD.



## CROSS SECTION OF 80' ROAD.



## C.S. OF CONSERVANCY LANE.



## CROSS SECTION OF ROADS & FOOTWAYS.

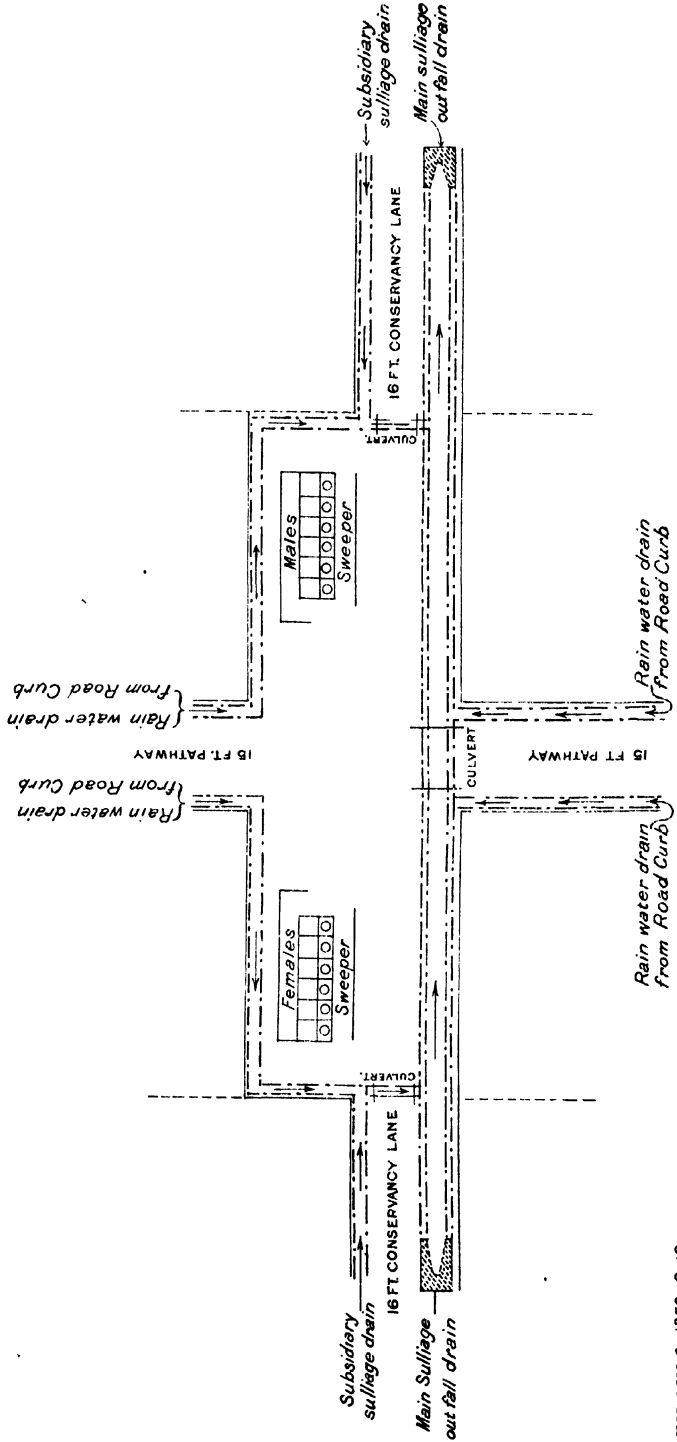
Scale 24 Feet = 1 inch



# PROPOSED LAY OUT FOR A TYPE BLOCK.

DETAIL OF PUBLIC LATRINE IN CENTRE OF BLOCK

Scale 24 Feet = 1 Inch





### “ NOTE ON THE LAY-OUT OF TOWNS.”

“ The question of the lay-out of new towns and extensions for existing ones is a matter which calls for early consideration.

“ In devising a lay-out there are several matters to be considered :—

“ (1) *Drainage*.—The Sanitary Commissioner has proposed that all sulliage drains should be carried along the conservancy lanes and that nothing but rain-water drains should be carried along the road fronts of houses.

“ This proposal seems to me one to be commended. It gets rid of the foul surface drains along the front of the houses which are a nuisance both to the inhabitants of the houses and also to passers-by.

“ It will entail all householders providing a sulliage drain leading from their houses into the public sulliage drains at the back and the proposal may therefore be resisted by house-holders on the score of expense.

“ The proposal contemplates the provision of footpaths along each side of the road, carried right up to the houses. At the junction of the road and footpath a kerb and shallow drain to carry rain-water, this rain-water drain being carried through the centre and round the ends of each block to connect to the sulliage drains, in the conservancy lanes.

“ In each conservancy lane would be provided two drains, one the main outfall drain collecting the drainage of several blocks on one side of the conservancy lane, the other a sulliage drain collecting the sulliage of the half block on the other side of the conservancy lane.

“ On the sketch attached is drawn out a typical block showing this arrangement of drainage [see figure].

“ (2) *Public latrines*.—The siting of public latrines has always been a difficult matter. An attempt has been made to solve the question by placing the public latrines for each block in a space in the centre obtained by cutting off 15 feet from the back of two sides in the block.

“ Access by the public is obtained by a footpath from each site in the centre of the block or along the conservancy lane. This proposal is also illustrated in the sketch attached.

“ (3) *Roads*.—To provide sufficient light and air it is considered that no road on which houses face on both sides should be less than 50 feet wide over all.

“ Main roads carrying considerable traffic might with advantage be somewhat wider, say, 60 to 80 feet.

“ Cross roads through blocks which are short length might also be with advantage 50 feet wide over all.

“ The conservancy lanes have to provide for a subsidiary sulliage drain about 2 feet over all.

“ A main outfall drain, average, say, 5 feet wide over all and a roadway for conservancy carts about 9 feet or a total width of 16 feet will be required as a minimum.

“ The footpaths through the centre of blocks have to carry two rain-water drains about 2 feet each over all and a pathway, say, 8 feet wide or a total of 12 feet.

“ The Sanitary Commissioner, however, considers that to be of any use in providing light and air they should not be less than 15 feet wide over all.

“ To recapitulate, the following minimum measurements might be laid down :—

“ Main roads, 60 feet.

“ Secondary roads, 50 feet.

“ Cross roads through blocks, 50 feet.

“ Conservancy lanes or back drainage spaces, 16 feet.

“ Footpaths, 15 feet.

“ (4) *Blocks*.—The Sanitary Commissioner favours a width of 40 feet as a width of frontage for sites with a depth of 60 feet.

“ Allowing 16 feet for the conservancy lane this makes the total depth of a block 136 feet.

“ The length of blocks might be limited to 975 feet allowing for twenty-four sites with a 15-foot pathway in the centre.

“ Any length appreciably greater than this without a cross road is inconvenient.



"There is no reason of course why the blocks should not be shorter if desired.

"(5) *Markets*.—In laying out any new town it is most necessary to make ample provision for a market or bazaar. A square 400-feet by 400 feet with a 60-foot road all round is not considered an excessive measurement to lay down as a minimum."

[Signed] E. GABBETT,  
Sanitary Engineer.

### THE LEASE OF RECLAIMED LAND.

The Bombay Government in a Resolution laid down the following ruling as to lease of certain land reclaimed by the Bombay Improvement Trust\* :—

"1. The Chairman, City of Bombay Improvement Trust, should be informed that Government are prepared to agree to lease the reclaimed land in question, after the expiration of the period to be leased by the Improvement Trust, on the following conditions :—

- "(i). That the lease shall be for 900 years.
- "(ii). That the restrictions imposed by the Trust as to the area to be built over shall continue during this period.
- "(iii). That the rent shall be half per cent. per annum on the valuation of the land for the first hundred years, one per cent. for the next hundred years, two per cent. for the next hundred years, three per cent. for the next hundred years, and four per cent. for the remaining five hundred years.
- "(iv). That this rent shall be irrespective of vacant area and area covered with buildings.
- "(v). That the valuation of the land for the purposes of calculating the rent shall be taken at Rs.5 per square yard.
- "(vi). That the lease shall be drawn up by the Solicitor to Government at the expense of the lessee including the stamp and registration fees.
- "(vii). That these terms shall hold good whoever may be the Trust's tenant.

"2. The Chairman should also be informed that a probable future sea-face road should not be lost sight of in any agreement made."

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\*Administration Report of the Municipal Commissioner for the City of Bombay for the Year 1914-15. Vol. II. Annual Report of the Executive Health Officer for 1914. p. 104.

## BOOK REVIEWS

**WATSON (Malcolm) [M.D., C.M., D.P.H.]. Rural Sanitation in the Tropics, being Notes and Observations in the Malay Archipelago, Panama and Other Lands.—xvi + 320 pp. Demy 8vo. With Illustrations. 1915. London: John Murray, Albemarle St., W. [Price 12s. net.]**

Of work in the Tropics fulfilled with the microscope, and its connected ologies in the clinical investigation of disease, books and journals have an endless record. These records beyond calling for passing admiration of the brain power and perseverance of their authors, by bringing about modification of methods of curative treatment, prove at times of utility to the individual; but it is rarely that their true value is appreciated until the man of Applied Hygiene—the sanitarian—secures utilization of their teaching in practice, for the benefit of communities. If a great truth has been revealed in the laboratory and public advantage is not only possible but capable of proof therefrom, what task could be simpler than that allotted to the sanitarian of placing the facts before the administrators of public funds, and shaking hands with himself as he witnesses the defeat of epidemic scourges. But a sea of trouble awaits the launch of a scheme by the sanitarian, and unless he be prepared not only to build a sea-worthy ship but steer it personally through storm and tempest to the destined harbour, he must rank as a mere paper spendthrift; the scheme is not the end but the commencement of his work. If it but touch a point of public policy, he must be prepared for essays by venerable officials and by the “oldest inhabitants” of the area affected, on the rending of society, if not revolution, his absurd faddism will bring about; representatives of engineering and finance will prophesy bankruptcy of local bodies if not of central governments, and pray the country may be rid of men void of all sense of proportion, whilst counter schemes by the dozen may have their advocates. Unless the sanitarian is prepared to meet these essay writers on their own ground with all charity and tact and “hide and fecht,” he will find he has mistaken his profession. This demands staying power, which, if it exists, few care to exercise—even with the knowledge that the lapse of the proverbial ten years may find his proposals adopted. As a result, the survival of would-be sanitarians in the Tropics is comparatively rare; men lured by the glamour of life-saving to adopt Applied Hygiene as a profession, are apt early in their careers to forsake it in disgust.\*

If, then, the sanitarian recognizes that the launching of a scheme implies that he must be prepared to defend it against all comers, the data on which his schemes are founded must stand the proof of free discussion.

The moral of the foregoing in a review of a book with the above title is not far to seek. The work is by Dr. Malcolm Watson of Malaya fame, who has earned the right to be regarded as a *practical* tropical sanitarian. Instead of wedding himself to this or that method of waging war against malaria, he has used all means reasonably applicable to the localities concerned. By splendid perseverance, he has converted representatives of labour and land interests in Malaya from being lukewarm believers into strenuous advocates of anti-malaria methods and, in witness of their faith, they have not failed to give his schemes full financial support. It has not sufficed for him to give it as his *ipse dixit* that drainage is the radical agent against malaria, and that this is compatible with sound agriculture; it has been essential that he should meet objections by those who doubt and the enquiries of the almost convinced. For this purpose, after toilsome field work in the hills and plains of the Federated Malay State, continued from year to year, he has been able to demonstrate the particular mosquito malaria bearers which wasted the planter's chances of profit; and, upon information so gained, he has suggested minor sanitary engineering schemes

\*The Government of India in a Resolution on Sanitary Organization (prior to the present war) declared difficulty existed in filling posts reserved for sanitary specialists.

which in execution have proved their soundness financially and in life-saving. This thoroughly practical method of working obviously could be improved upon by not only collecting trustworthy data in a special locality, but by searching for and contrasting results of efforts under analogous conditions in other countries. This, then, is the leading feature of his work.

Irrespective of an interesting account of how, step by step, Dr. Malcolm Watson arrived at his choice of methods in Malaya, the book describes a tour in other tropical countries where anti-malarial measures have been accomplished or are in progress. The text, from paragraph to paragraph, breathes the enthusiasm of the practical sanitarian in the appropriate task of weighing evidence after personal inspection and enquiry, and doing his best in the public interests to arrive at unbiased conclusions. In fulfilling this function, Dr. Malcolm Watson has not only produced a book affording interesting reading, but one which is replete with information useful to the sanitarian in the tropics.

W. G. K.

LUKIS (The Hon'ble Surgeon-General Sir Pardey), [K.C.S.I., V.D.] & BLACKHAM (Lt.-Col., R. J.), [C.I.E., R.A.M.C.]. **Tropical Hygiene for Residents in Tropical and Sub-Tropical Climates.**—3rd Edition. Revised and Enlarged. 302 pp. Crown 8vo. With frontispiece and 52 text-figs. 1915. London: W. Thacker & Co.; Calcutta: Thacker, Spink & Co. [Price 4s. 6d. net.]

This work is stated by the authors to be "for residents in the tropical and sub-tropical climates." This represents a wide field of suggested utility, which is further increased by the statement in the preface to their third edition, that they hope it may be "useful not only to students of Elementary Hygiene but to junior practitioners and students of medicine." Copies of the work have been issued by the Indian Council of the St. John Ambulance Association "in India and to Territorial Officers." The authors must have found themselves confronted by difficulties in selection of matter that would be suitable for consumption at once by lay residents, the medical student and the junior practitioner. To fulfil so difficult a programme either there must be strict attention to many practical details or, these being lightly assumed as known to the reader, the work must be largely devoted to a systematic treatment of Hygiene. Failing a recognition of either method, there must result the inevitable compromise of the production of a book which cannot serve both standards. It is therefore not surprising that traces of halting between two opinions are at times discoverable. For example, whilst the layman might without hesitation accept the statement that "diarrhoea if allowed to run on may develop into cholera" [p. 8], the junior practitioner might doubt it, in the absence of a simultaneous reference to the *causa causans* of cholera according to KOCI, and the latter might also "hac his doots" if beriberi be held to be an "infectious disease" without qualification [p. 97]. Similarly [p. 70] the following diseases, which individuals are stated to be liable to contract owing to "vitality which has been lowered" by constant overcrowding, seem to have been grouped with more reference to instruction of the layman than the junior practitioner:—(1) Indigestion, (2) Bronchitis, (3) Pneumonia, (4) Weakness and Debility, (5) Heat Stroke. They are also said to be "very liable to contract other diseases such as consumption, inflammation of the lungs or bronchial tubes, dysentery, cholera, plague, small-pox, typhoid fever, measles, diphtheria, as well as severe inflammation of the eyes called ophthalmia."

In the matter of cholera, useful hints are given to the householder and the importance of the provision of a pure water supply is duly urged as an important preventive measure; but to guard against chance contamination before consumption, the only suggestion made is the use of permanganate of potash. The authors possibly trust to the adoption of their sound advice, afforded in the chapter on water-supply, that the boiling of water "should be universally adopted in Indian households"; but, having regard to the aim of the book, to miss the opportunity of urging the "tea-kettle policy" in reference specifically to cholera, seems undesirable.

On the subject of plague, the position is taken of asserting that the "question of prevention is a very simple one" [p. 15]. Elsewhere, it is stated, "the whole question of the prevention of plague is one of domestic hygiene" [p. 13]. These are opinions which would make a sharp cleavage between communal and domestic hygiene and the responsibility of the State, and which not a few sanitarians and philanthropists may reasonably consider open to discussion. In the matter of conveyance of plague, the reader is warned that "a plague patient is not infectious and that there is no need for being afraid of going near him." This is a dangerous generalization, in that it ignores primary and secondary pneumonia and the possibility of transfer of infected fleas; it also is forgotten to guard the generalization by a differentiation of conditions in a well kept hospital and the average hut.

Whilst the tendency towards systematic treatment of hygiene as opposed to practical details for the layman's use in the major portion of the work is marked, there has resulted the collecting of a mass of information which should be of great utility to the numerous peoples embraced in the term—the "residents in tropical and sub-tropical climates."

W. G. K.

GORGAS (William Crawford) [Surgeon General]. **Sanitation in Panama.**—298 pp. Crown 8vo. Illustrated. 1915. New York & London: D. Appleton & Co. [Price 7s. 6d.]

Seven years ago Sir Rubert BOYCE published a work with which he hoped to stimulate British interest in the progress of tropical medicine and in the growth of sanitation in tropical climates. He chose as an attractive title the question:—"Mosquito or Man?" Is man to "wrest vast provinces from the sway of the insect pests" or are these pests to defy the colonist and traveller when he ventures into their domain? No better reply could be given to such a question than the excellent work recorded by Surgeon-General Gorgas, Chief Sanitary Officer, Panama Canal and Major-General in the "U.S.A." army.

Although the title of General Gorgas' work is "Sanitation in Panama" the first nine chapters deal with sanitary work in Havanna. The years of apprenticeship spent in Havanna provided General Gorgas and his staff with knowledge and experience without which the work in the Canal Zone would have presented greater difficulties, or might even have failed altogether.

Chapter I. gives a general outline of the harm done to life, wealth and property in various parts of the United States infected with yellow fever during the two hundred years which preceded the Spanish-American war. The disease spread along the Mississippi valley as the population increased and spread. The deadly epidemic of 1878 was one of the worst known in the United States. "In this epidemic over thirteen thousand people in the Mississippi valley alone lost their lives, and the loss of wealth is estimated at considerably more than one hundred millions of dollars." The evil is, moreover, not confined to the actual area of the epidemic. The dread of the disease keeps ships from the ports and merchants from the markets of the affected area. Labour becomes scarce, crops are neglected and poverty and depression, sometimes to an appalling extent, remain in the wake of a yellow fever epidemic. The description given, though restrained, is sufficiently terrifying. Fortunately the disease has never become endemic in the "U.S.A."

The infection generally came from some part of the Gulf of Mexico or from the coasts of the Caribbean Sea. The chief centre of this area of infection was the city of Havanna in the island of Cuba. In 1898 when Cuba came under the American Government the true cause of the infection was unknown. Yellow fever was considered to be a contagious disease conveyed by filth and the vomit and excreta from the sufferers. Major Gorgas, being immune to yellow fever, applied to go with the troops to Havanna and made every effort to have the city put into a sanitary condition. He writes:—"By the middle of the year 1900 all the city Governments were perfectly organized and were accomplishing all that it was

possible for them to accomplish. I believe that Havana was cleaner than any other city had ever been up to that time." But in spite of all these efforts the attacks of yellow fever grew worse and the Cubans pointed out "that the very cleanest and best kept portions of the city" were the worst places for yellow fever. Yet this good work helped on the discovery of the real method of infection. Attention was turned to the *Bacillus* of SANARELLI, but after investigation Drs. REED and CARROLL showed that that bacillus was identical with the bacillus of hog-cholera. It had nothing to do with yellow fever.

Following step by step the work of the local commission and sanitary staff in Havana we come to the Commission appointed by General George M. STERNBERG, then Surgeon-General of the "U.S.A." with Dr. REED as its chief. After visiting Havana and disposing of the claims of SANARELLI's bacillus they turned their attention to the theory, strongly advocated by Dr. Carlos FINLAY, that yellow fever was in some way conveyed by a mosquito, *Stegomyia fasciata*. The gradual progress from Dr. FINLAY's suggestion to the experiments of the "Reed Commission," in Chapter II., make most interesting and fascinating reading. General Gorgas not only has a valuable story to tell but he tells it well with pleasant wanderings into local history and legend. Fortunately the Commission could obtain volunteers for experiment. The immune inhabitant of Havana could command higher wages than the non-immune. Therefore the newly arrived Spaniards were very willing to go into Dr. REED's camp where the experiments were carried on. When the patient could present a certificate of immunity he could demand double wages and was moreover protected for all time. General Gorgas believes that an attack of yellow fever gives as great or even greater immunity than an attack of small-pox. While in the experimental camp the volunteers were well treated, obtained immunity with a mild attack of yellow fever and at the end received two hundred and fifty dollars. A story full of grim humour on pages 30 and 31 shows that the American soldiers on guard took steps to acquire these benefits and dollars for themselves.

It is not necessary to go into the details of the experiments and even the conclusions may be briefly stated. They should be known to members of the medical profession. Briefly stated the Commission's results were :— That yellow fever is conveyed from man to man by the female *Stegomyia fasciata* and that to become infected the mosquito must bite the patient during the first three days of his disease. Twelve to twenty days must elapse before the mosquito can cause infection in man. Blood taken from a patient during the first three days and injected into a non-immune will produce yellow fever. Individual *Stegomyia* remain infectious for long periods.

Major Gorgas (as he then was) accepted the findings of the "Reed Commission" and with his junior assistants and large sanitary staff sought ways of making practical application of the new knowledge. Vaccination was tried, non-immunes being admitted into the Las Animas Hospital. An infected mosquito was allowed to bite the patient in the hope that a mild attack would follow, with subsequent protection. Unfortunately the dose conveyed by the mosquito could not be controlled and several of the experimental cases showed severe symptoms and three cases died. This was a grave disappointment because the cases produced in the same way in the "Commission" camp had all been mild in type. Clearly vaccination would not do. Since the mosquito to become infected had to bite a case of yellow fever during the first three days, if such an accident could be prevented in every case the disease would disappear. It was made compulsory to report all supposed cases to the Health Department. Each case was examined by a special diagnosis Commission and if found to be a true case of yellow fever was removed to screened wards in the Las Animas Hospital. If the patient wished to be treated at home skilled carpenters were sent to screen certain rooms. Guards were placed over the screened doors. This method was of no value unless the case was seen very early. If mosquitoes had already been infected there still remained twelve or fourteen days before they could pass on the infection. *Stegomyia fasciata* is a "house mosquito" and therefore not likely to go far from the room or house in which she became infected. The next step, therefore,

was to destroy all mosquitoes in the sick man's house and in adjoining houses. This was done by specially appointed gangs who sealed the houses and fumigated with sulphur, pyrethrum, or tobacco. The reasons for using one or other fumigant are given in Chapter V. It was made punishable to allow *Stegomyia* larvae to breed in tubs, tins, etc., and all water tubs were screened. With great wisdom the power to inflict fines was placed in the hands of the Sanitary Officer. The City was divided into areas for inspection. Of the actual methods employed to check the breeding of *Stegomyia* and *Anopheles* and to protect mankind from their bites no more need be said as these matters will be referred to in the review which follows. At the end of 1902 yellow fever had practically disappeared from the City of Havanna.

Similar attention was paid by the Sanitary Staff under Major Gorgas to the *Anopheles* mosquitoes, carriers of the *Plasmodium* of malaria. Screening of houses, oiling and cleaning of spots where they might breed and the use of quinine for prophylaxis and treatment reduced the number of deaths from malaria from 325 in 1900 to 4 in 1912. As General Gorgas says:—"Four deaths from malaria can very safely be put down as coming from the outside and it can with equal safety be said that by 1912 malaria had become as completely extinguished in Havanna, as had yellow fever in 1902."

Chapter VII. contains letters connected with the work in Havanna which passed between Dr. REED, writing from the Surgeon-General's Office in Washington, and Major Gorgas. These letters show enthusiasm on one side and friendly help and encouragement on the other. The next two chapters are taken up with the history and geographical distribution of yellow fever and then, with Chapter X, we come to Sanitation in Panama.

In 1902 Major Gorgas pointed out how useful the discoveries made in Havanna might be in connection with medical arrangements in the Canal Zone. How Major Gorgas was appointed Chief Sanitary Officer in April 1904 is told in the same Chapter and the rest of the book contains a most attractive account of sanitary work in Panama, of initial difficulties overcome and of good results achieved. Armed with weapons fashioned in Cuba Major Gorgas and his staff were ready to undertake the greater and more difficult enterprise in the Canal Zone. All praise is due to them for years of patient and successful labour often hindered by thoughtless critics.

Although the chief object of the work under review has been to relate successful results in the war against *Stegomyia fasciata*, and such species of *Anopheles* as carry the *Plasmodium* of malaria other diseases are not forgotten. General Gorgas' book contains a useful Chapter on plague and the precautions taken to prevent infection. "Sanitation in Panama" is furnished with a map of the Canal Zone and some clear and useful photographs illustrating the text. General Gorgas has written a book that everyone may read with pleasure and profit.

J. H. Tull Walsh.

LE PRINCE (Joseph A.) [C.E., A.M.] & ORENSTEIN (A. J.) [M.D.]. **Mosquito Control in Panama. The Eradication of Malaria and Yellow Fever in Cuba and Panama.** With an Introduction by L. O. HOWARD, [Ph.D., LL.D.].—xvii + 335 pp. Demy 8vo. With 100 illustrations. 1916. New York and London: G. P. Putnam's Sons. [Price 10s. 6d. net.]

Mr. Joseph Le Prince had the advantage of training and experience under Major GORGAS in Havanna. When Major GORGAS was transferred to the Panama Canal Zone as Chief Medical and Sanitary Officer Mr. Le Prince was appointed Chief Sanitary Inspector of the "Isthmian Canal Commission." He held that post from 1904 to 1914. Dr. A. J. Orenstein was Assistant Chief Sanitary Inspector. "Mosquito Control in Panama" bears the same relation to "Sanitation in Panama" that a laboratory manual bears to a general text book. It deals exhaustively with the various methods tried and adopted in Cuba and in Panama for the purpose of protecting man against mosquito-borne disease. The two diseases

with which the work is mainly occupied are yellow fever, spread by the *Stegomyia fasciata* and "Malaria," carried from man to man by certain species of Anopheles.

Dr. Howard's Introduction is brief. It bears witness to wise foresight on the part of President ROOSEVELT and to the happy enthusiasm with which Mr. Le Prince entered upon his duties as Inspector. The President let it be known that with regard to the medical and sanitary arrangements in the Canal Zone "it was his intention to seek for the best man in the world for the task, to pay him whatever would be necessary and to give him full power." Owing to his former experience Col. GORGAS was the best man available and the results achieved show that he was loyally supported by the members of his staff into whose hands the executive details fell. What those details were and the means through which the results were attained are clearly set out in "Mosquito Control in Panama."

The book is divided into two parts: Part I. deals with the "Anti-Malaria Campaign," while Part II., a much shorter record, tells of "The Yellow Fever Campaign." To understand how serious was the outlook in 1904 one must remember that the Canal Zone was forty-eight miles long, ten miles wide, in the torrid zone, with a mean annual temperature of about 80° F. and a long rainy season. It was a mass of swamp and jungle and "climate and temperature are favourable to mosquito propagation the year round." Along the railroad, already established, were many villages, "filthy, without regulations or restrictions, without sewers and having the usual water supply of the country, viz., rain water during the wet season and water from streams during the dry season." The camps used by the French were in much the same insanitary conditions and mosquitoes swarmed throughout the area. Malarial fever was very prevalent and of Corozal, a village near Panama, it was said by the coloured people that "to live there is to be sick and die." There were hospitals that had been built by the French, that at Ancon being large and well situated, but mosquitoes filled the wards and patients admitted for trivial injuries often contracted yellow fever or malaria and thus the hospitals got a bad reputation.

If only because of the "articulate monotony" no mosquito is altogether acceptable but it is necessary to distinguish the homicidal criminals from the mere hooligans. Mosquitoes from the Canal Zone were collected, and identified by Mr. F. KNAB. A list of Anophelines from Panama is given on page 52. "Biting experiments were made by Dr. Darling to determine which of the Isthmian Anopheles were malaria carriers." *A. albimanus*, Wied., *A. tarsimaculata* Goeldi, and *A. pseudopunctipennis* became infected and the first named was found to be the "all-important" transmitter of malarial fever. Anopheles as a rule were absent from dwellings, their breeding places being generally "seepage outerops, pools, ponds, lagoons, ditches, streams and the edges of rivers." The habits of these mosquitoes and their larvae are described and the propagation areas considered in Chapters IV. to VII. Chapter VII. is full of interesting information as to the flight of mosquitoes, and as the result of the numerous observations it was shown that the "Anopheles knew where they desired to go" and that they could fly against the wind, making long flights to reach groups of inhabited houses. *Stegomyia fasciata*, always called *Aedes calopus* D.K. in Mr. Le Prince's book, is a weak flier and rarely moves far from her breeding place in or near inhabited houses.

Chapter VIII. introduces us to the anti-malarial work with means of attack on breeding areas by filling them up. Drainage is dealt with in Chapter IX and this is followed by chapters full of detail showing the reader how best to destroy breeding areas and larvae by oiling, by the use of "larvacides," by encouraging natural enemies, and by clearing water plants, algae and jungle from ditches, ponds and the margins of streams. Methods of screening houses and methods for the destruction of adult mosquitoes fill Chapter XV. with excellent and most useful instruction and Chapter XVI., giving the results achieved, brings us to the end of Part I. As Mr. Le Prince rightly says "the methods of malaria control" were "put to a severe test" on the Isthmus and "they gave successful results."

It is no part of a reviewer's duty to eviscerate a good and useful book for the satisfaction of desultory readers. "Mosquito Control in Panama" is a practical manual worth buying and no young medical officer working in the tropics should fail to possess it. It will be found "a very present help" in all kinds of difficulties which may and do arise where insect-borne diseases are prevalent. Part II. which deals with the "Yellow Fever Campaign" is as satisfactory in its methods and results as Part I.

The book is full of excellent photographs, which are not only good as artistic illustrations but are very helpful to the reader. The work is well printed and free from errors and one can truly say that the authors of "Mosquito Control in Panama" have done a piece of work which will earn the gratitude of many workers in tropical climates.

J. H. Tull Walsh.

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[During investigations on the anatomy and life-history of the "common silver fish insect," *Lepisma saccharina*, two Gregarines were found in the guts of the insects. The larger gregarine was the less numerous. The life cycles are briefly described and illustrated diagrammatically. Feeding experiments were conducted.]

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[The parasites studied were *Aggregata eberthi* and *Diplocystis schneideri*. In the former parasite there are six chromosomes, which do not arise from the karyosome, in the sexual forms. Reduction occurs at the first division after fertilisation, and not during gametogenesis. In the *Diplocystis* gamont the vesicular karyosome gives rise to three chromosomes, and reduction division occurs immediately after fertilisation. [Those interested in cytology should consult the original.]

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- [The author in 1895 stated that blackhead in turkeys was due to the so-called *Amoeba meleagridis*. The organism is rounded, containing nucleus and karyosome, and is said to occur in the connective tissue and lymph spaces of the mucosa and submucosa. The chief lesions are in the caeca and liver.
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*See also* under Disease Headings.

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## LIST OF REFERENCES.

[Continued from BULLETIN, Vol. 7, pp. vii.-xlv.]

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**AMOEBIASIS (including Entamoebic Dysentery and Liver Abscess).**

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[A recommendation to use the endoscope in the treatment of all cases of bacillary dysentery, which do not yield promptly to the usual remedies when administered by the mouth. MELOCCHI's pattern of the instrument is the one employed by the author.]

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[The centipede, *Geophilus carpophagus*, is figured. It was expelled from the nasal fossa of a man who lived near Paris. The creature appears to have been there for some months].

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